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BIOLOGY

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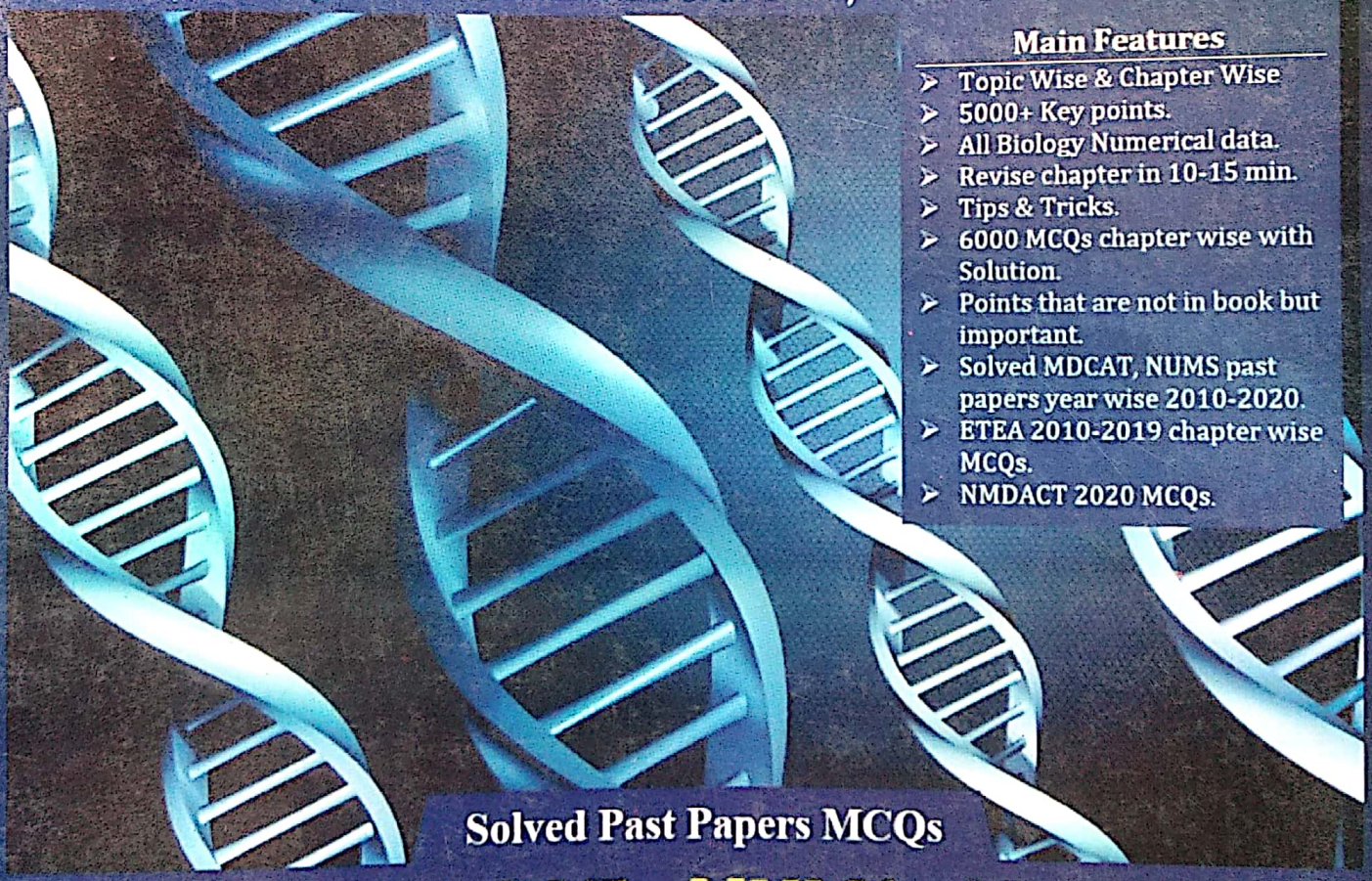

Main Features

- Topic Wise & Chapter Wise
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- 6000 MCQs chapter wise with Solution.
- Points that are not in book but important.
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- ETEA 2010-2019 chapter wise MCQs.
- NMDACT 2020 MCQs.

Solved Past Papers MCQs

ETEA	MDCAT	NUMS	NMDCAT
2010-2020	2010-2019	2010-2020	2020

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First Year MCQs _____ 225
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TO THE STUDENTS

This book provides a complete review of the material covered in two years course in biology. It is in the form of key points that ranges from elementary and basic to advanced and sophisticated level. By using this book, you can prepare yourself for medical collages admission tests and at college level biology examination.

In ETEA 2019, there were 72/80 MCQs from this book.

These contents of this book are mainly based on recommended textbook for college level biology course.

We wish you every success and invites positive critisimm and suggestions for the improvement of the information.

Shamsul Amin Khan

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Key Points

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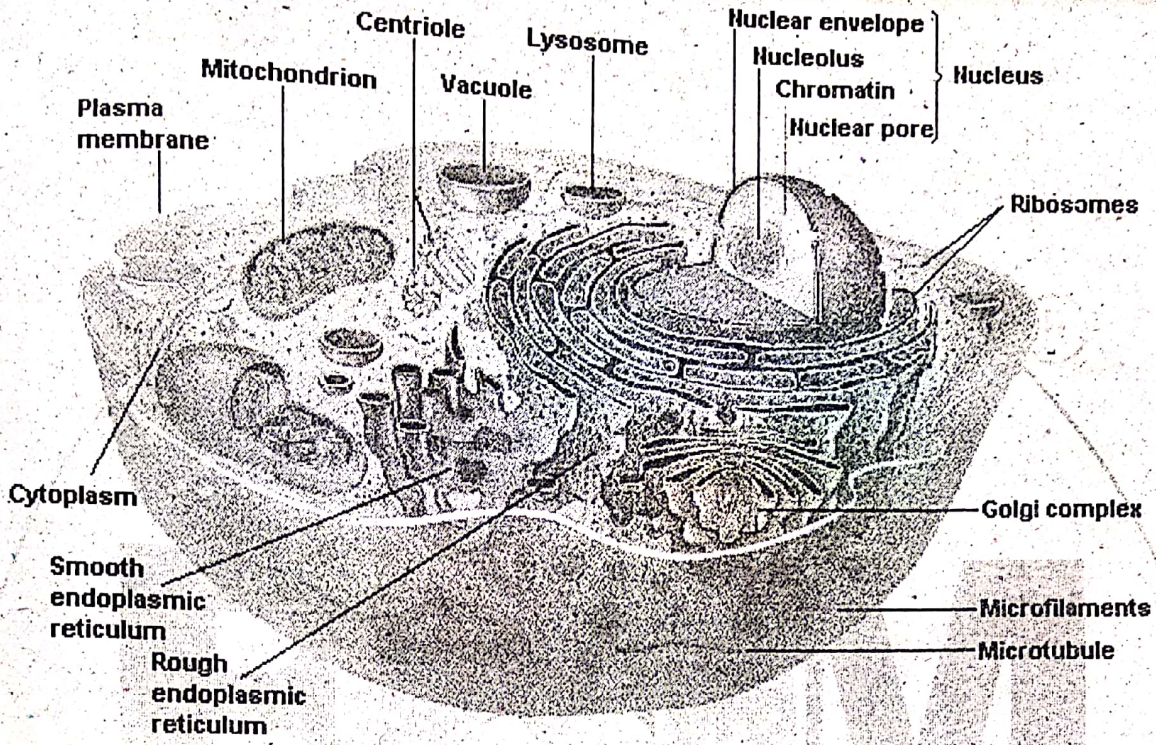

S.No	QUESTIONS	ANSWERS
	TECHNIQUE USED IN BIOLOGY	
1.	TEM can magnify an object upto	10 lac times
2.	SEM produce	3D image ETEA-2017 & 2018
3.		

Objective lens	Eye piece lens	Magnification
10 x	6x	60x
40x	6x	240x
10x	10x	100x
40 x	10x	400x

4.	Methylene and neutral red are	Vital stains
5.	Aniline sulphate, iodine solution and schultz's solution are	Temporary stains
6.	Chlorine, zinc and iodine are present in	Schultz's solution
7.	Stain suitable for DNA is	Feulgen's stain
8.	Stain suitable for nuclei and obelia coloni is	Borax caraime
9.	Stain suitable forfor cellulose and cytoplasm is	Eosin
10.	Stain suitable for blood cells	Leishman's stain
11.	Aniline sulphate is used for	lignin
12.	Iodine solution is used for	Starch
13.	Schultz's solution is used for	lignin, starch, cellulose and cutin
14.	Hemacytometer, cryostorage container and autoclave are	Tissue cultre apparatuses
15.	Multlipication of explant give rise to	Callus

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16.	Selection, sterilization, callus formation, root formation and shoot formation are main steps of	Tissue culture
	PLASMA MEMBRANE	
17.	The first wall formed in developing cell is	Primary wall
18.	primary and secondary walls are	Optically active
19.	Nitrocellulose is an	Explosive
20.	Integral proteins which are carriers are also know as	Permeases **ETEA-2014**
21.	Glycoprotein and glycolipid are also known as	Permeases
22.	Often the outer region of cytosol is more	Gel like
23.	Hormone corticosteroids made in adrenal cortex and sex horones testosterone, estrogen are initiated by	Endoplasmic reticulum
24.	Plasma membrane are 7nm wide and its structure is	Dynamic
25.	Primary cell wall is mainly made of	Polysaccharides cellulose **ETEA-2013**
26.	Secondary cell wall mainly contain	Pectin **ETEA-2011**
27.	The soluble part of cytoplasm which forms ground substances are called	Cytosol
28.	Nucleus was discovered by Robert brown in	1838 **ETEA-2013**
29.	The attachment of two sub-units of ribosomes along mRNA is controlled by	Magnesium ions
30.	Secondary wall, primary wall and middle lamella	Layers in plant cell from inside to outside **ETEA-2009**
31.	The ability of an instrument to reveal the minor details of an object is its	Resolving power
	CELL WALLL, CELL MEMBRANE,ER AND RIBOSOMES	
32.	Function of rough endoplasmic reticulum	Protein synthesis **ETEA-2005**
33.	Fuction of smooth endoplasmic reticulum	Lipid syntheises **ETEA-2012**
34.	Ribosomes are attached to endoplasmic reticulum hence called	Rough edoplasmic reticulum **ETEA-2019**
35.	Growth movement of pollen tube towards the egg is	Chemotropism
36.	Size of ribosome in prokaryotic cell is	70S
37.	Size of ribosome in eukaryotic cell is	80S
38.		

Ribosomes	Smaller unit	Larger unit	Total size	
Prokaryotic	30 S	50 S	70 S	**ETEA-2009**
Eukaryotic	40 S	60 S	80 S	**ETEA-2015**

39.	In paper chromatography we use	Water absorbed on papers
40.	For separation of compounds from mixture use a technique called	Chromatography
41.	The growth and reproduction of eukaryotic cell is dependent upon its	Nucleus
42.	Special protein carrier in plasma membrane	Protoplastids

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43.	Cell wall of cells are held together by	Middle lamella
44.	The membrane is like sea of lipids in which proteins are floating	Fluid mosaic model
45.		

Wall	Thickness
Middle lamella	1 μ m
Primary wall	1 – 3 μ m
Secondary wall	5 – 10 μ m

46. Chronological developments towards fluid mosaic model of plasma membrane

1	Gorter & Grendel 1925	Two layers of lipids molecule only
2	J f Danielle & Davon 1935	Lipid bilayer is covered with protein and protein pores
3	Roberston 1959	Unit membrane model
4	S J Singer & G L Nicholson 1972	Fluid mosaic model

LYSOSOMES, GLYOXISOMES, PEROXISOME

47.	The cisternae together with vasicles are called	Golgi-complex
48.	Lysosomes contain variety of enzymes called	Hydrolases
49.	Protein extending from in double layer of lipids completely are called	Intrinsic protein
50.	Some protein are on one side of membrane called	Extrinsic protein
51.	Carbohydrates attached to lipids are called	Glycolipid
52.	Carbohydrates attached to proteins are called	Glycoprotein
53.	Channels of endoplasmic reticulum are separated from one another by spherical or tubular membranes one above another called	Cisternae
54.	Circulation, syntheses, detoxification, mechanical support and communication	ER functions **ETEA-2006**
55.	In cytoplasm, small ions and molecules form	True solution
56.	In cytoplasm, some large molecules form	Colloidal solution
57.	Active mass movement of cytoplasm is called	Cyclosis
58.	The unit of Golgi apparatus	Dictysomes
59.	Stacks of flattened, membrane bounded sacs called	Cisternae
60.	Cisternae associated vesicles are called	Golgi-complex
61.	Storage of secretory products and packaging and modification of the secretory products	Functions of Golgi apparatus
62.	The food digestive enzyme of lysosome are called	Hydrolases
63.	Enzymes are budded off as Golgi vesicles and are called	Primary lysosomes
64.	Metamorphosis in animals are example of	Lysosomal activity

PLASTIDS

65.

Plastids	Found in
Chloroplast	Green parts
Chromoplast	Other than green parts
Leucoplast	Colourless parts

66.	Primary lysosomes are synthesized in RER are processed in	Golgi apparatus

MIX

67.	Ribosomes are synthesized in	Nucleolus of the nucleus
68.	The two sub units of ribosomes are attached by	Mg^{++} **ETEA-2009**

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69.	In animals peroxisomes are present in	Liver and kidney
70.		

Organisms	No of flagella
Mammalian spermatozoon	1
Chlamydomonas	2
Paramecium	Few thousands

71.	In leaves of plants, photorespiration occurs in	Peroxisomes
72.	Glyoxisomes (only in plants) contains glycolic acid, oxidase and	Catalase
73.	Conversion of fatty acids to carbohydrates are done by	Glyoxisomes **ETEA-2010**
74.	Chloroplast Size	4-6 micrometer
75.	Length and diameter of centriole	0.3-0.5 µm and 0.2 µm
76.	Each centriole consist of	9 microtubules (27 tubules)
77.	In animal cells and lower plpants, two centrioles are present at	Right angle to each other **ETEA-2017**
78.		

Cytoskeleton	Subunit
Microtubules	Tubulin protein
Microfilament	Actin protein
Intermediate filaments	Fibrous

79.	Small knob structures on inner surface mitochondria is called	Elementary / F1 particles
80.	The presence of ribosomes and DNA indicate that	Protein is synthesize here in mitochondria
81.	The average number of thylakoids to form one granum is	50 or more
82.	Chloroplast and mitochondria are	Self-replicating organelle
83.	Glyoxisomes and plastids are unique organelle found in	Plants only
84.	Mitochondria is absent in	Mature RBCs
85.		

Organelle	Diameter
Chloroplasts	4 -6 µ m **ETEA-2015**
Nucleus	10 µ m
Ribosomes	20 n m

86.	The central bindle of microtubules in cilia is called	Axoneme
87.	Mitosis is missing in	Prokaryotes
88.	Prokaryotic Cell wall is made of	Murein
89.	**ETEA-2013**	

Species	No of chromosomes	Species	No of chromosomes
Drosophila	8	Man	46
Garden pea	14 **ETEA-2019**	Chimpanzee	48
Onion	16	Potato	48
Frog	26	pigeon	80

90.	Eukaryotic Cell wall is made of	Cellulose

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91.	In cell one organelle are involved in function of other except endoplasmic reticulum	And peroxisome
92.	Glyoxisome is only found in	Plant cell **ETEA-2006**
93.	Cell fail to detoxify the waste substances produced in it because it does not posses	Enough Smooth Endoplasmic Reticulum **ETEA-2012**
94.	Mitosis occur in nucleus with nuclear membrane intact in	Fungi
95.	Ascomycota reproduce asexually by means of	Conidia
96.		

Drugs	used for	Obtain from
Ergotamine	Baby delivery	*Claviceps purpurea*
Penicillin	Antibiotics	*Pencillium chrysogenum*
Cephalosporin	Antibiotics	*Cephalosporin acremonium*
Griseofulvin	Antibiotics	*Pencillin*

97.	Braking down of glucose to produce ethanol and carbon dioxide is done by	*Saccharomyces cerevisiae*
98.	Yeast contain	*6000 genes*
99.	Peroxisomes are most common in	Liver and kidney cells
100.	Photorespiration may occur in	Peroxisomes
101.	Peroxisomes break down hydrogen peroxide to	Hydrogen and oxygen
102.	Converting of fatty acids to carbohydrates are the primary activity of	Glyoxisomes **ETEA-2012**
103.	Cyclosis and amoeboid movements are because of	Microfilaments
104.	Microtubules (25nm) are made of	Tubulin protein
105.	Microfilaments (7nm) are made of	Actin protein
106.	Intermediate filaments (8-12nm) are made of	Fibrous protein
107.	Cilia and flagella contain	20 Microtubules
108.	The bundles of microtubules comprising the axoneme are surrounded by	Plasma membrane
109.	Mitochondria are also called	Power house of the cell **ETEA-2013**
110.	The shapes of mitochondria may be	Vesicles, Rods or Filaments
111.	The presence of ribosome and DNA in mitochondria shows that it is	Self Replicating organelle
112.	Small knob present in inside of mitochondrial wall is known as Elementary particles	Or F1 particles
113.	Two subunits of ribosomes are attached by	Mg^{++} **ETEA-2012**
114.	Chlorophyll contain	Mg^{++}
115.	Haemoglobin contains	Fe^{++} **ETEA-2011**
116.	Chromoplast helps in pollination and dispersal of	Seeds
117.	The place where spindle fibers are attached is	Centromere
118.	Sedberg is unit of	Ultracentrifugation
119.	Metamorphosis of animals is example of	Lsosomal activity
120.	In glycogenesis type II , the liver and muscles appear filled with	Glycogen **ETEA-2012**

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121.	Tay-Sach's disease is involved in the catabolism of	Lipids
122.	Diameter of peroxisome is	5 micrometer
123.	In animal, peroxisome is also known as	Microbodies
124.	Photorespiration may occur in	Peroxisome
125.	Spindle structure formation is due to	Microtubules
126.	Cyclosis and amoeboid movemetns are due to	Microfilament
127.	Cell shape is maintained by	Intermediate filament
128.	Centriole is present in	Lower plant
129.	Protein, ribosome and small circular DNA is present in	Chloroplast
130.	Chloroplast is	Self replicating organelle
131.	Nucleopores present in egg	30000
132.	Nucleopores present in erythrocytes are	3-4
133.	Cel wall of bacteria is made of	Murein
134.	Cell of plant is made of	Cellulose
135.	Polysaccharide bonded with amino acid are called peptidoglycan or	Murein ETEA-2019
136.	Single, circular and double stranded DNA molecule is present in the	Bacteria ETEA-2016
137.	The two prominent structure present in the nucleus are	Chromosome and nucleous
138.	The largest and more concpeicuous structure or cell organelle is the double membrane bounded	Nucleus

THE FOLLOWING TABLE IS EXTRA BUT CONTAIN SIMPLE AND IMPORTANT INFO

	CELL WALL	CELL MEMBRANE
139.		
140.	Present only in plants, and in some fungi, bacteria, algae.	Present in all types of cells, in humans, animals, plants, bacteria, etc.
141.	It is the outer non-living part of the cell but not an organelle which encloses cell membrane and provides a fixed shape.	It is an outermost, flexible, living organelle of the cell which provides shape to the cell.
142.	It is made up of pectin, chitin, lignin, glycol proteins, glycolipids, sugar, and cellulose.	It is a lipid bilayer. And is composed of lipoproteins and carbohydrates.
143.	The structure of the cell wall is 20-80nm in thickness	The structure of the cell membrane is 7.5–10 nm in thickness
144.	It is the thick and rigid structure with a fixed shape.	It is thin and delicate structure. It is flexible to change the shape as needed.
145.	It protects the cell from the external environment.	It protects and maintains the internal environment of the cell.
146.	The cell wall is elastic.	The cell membrane is non-elastic.
147.	The cell wall is metabolically inactive	The cell membrane is metabolically active.
148.	Cell wall lack receptors.	The cell membrane has receptors to receive signals from external chemicals.
149.	The cell wall grows in thickness over time. Further, it occupies the whole cell in the plant as the cell ages and dies.	It is of the same thickness for the whole lifetime of the organism.
150.	The cell wall is semi-permeable. It allows passage of substances with the size of 30-60 kD.	The membrane is permeable and controls the movement of the substance into and outside the cell. That is, it can allow water and other substance to pass through selectively.

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151.	Functions include protection from the external environment.	Functions include permeability, signal reception, motility conduction, cell division, sexual reproduction etc.

Microcope:
1. Light microcope →500X
2. TEM → 10 lac times
3. SEM → 3D ETEA

Permanent stains
4. Aniline blue → fungal hypae and spores
5. Borax caramine → nuclei and obelia colony
6. Eosin → cytoplasm and cellulose
7. Feulgen's stain → DNA
8. Leishman's Stain → blood cells
9. Methylene blue → nuclei
10. Safranin → nuclei lignin and plant tissues ETEA-2019
11. Aniline sulphate → lignin

Temporary staisn
12. Iodine solution → starch
13. Schltz solution → starch, lignin, protein and cellulose

14. Automated cell counter → hemocytometer
15. Liquid nitrogen freezer or crystorage container

16. Chromatography depends on solubility and molecular masses
17. Column chromatography for photosynthetic pigment, suger and amino acids.
18. Many cell have only primary wall

Cell wall components use
19. Itrocellulose → explosive
20. Rayan → textile fibre
21. Cellophone → partially permeable membrane
    Plastics including celluloid and cinematography
    Paper making

22. Microtubule → spindle structure ETEA
23. Microfilament → cylosis and amoeboid movement ETEA
24. Intermediate structure → cell shape

25. Centriole → low plant and microorganism
26. Cilia and flagella → 20 micro tubule ETEA
27. Centriole → 27 microtubule ETEA
28. Free ribosome → haemoglobbin in new RBCs formation

29. S → ultracentrifugation unit
30. Spindle fibre attached to centromere
31. Bacteria → single, circular and double stranded DNA ETEA
32. Bacteria = 10 times of body cells
33. Prokaryotes→ no mitosis
34. Prokaryotes → binary fission occurs ETEA

In Bacteria
35. Sexually →congugation ETEA
36. Asexually → binary fission or multiple fission(spore formation)

70S ribosomes is of NMDCAT-2020
37. Prokaryotes
38. Chloroplast ETEA
39. Mitochondria

Dimater
40. Peroxisome → 0.5micro m ETEA
41. Centriole 0.2 micro m
42. Chloroplast → 4-6 micro m ETEA
43. Nucleus → 10 micro m

Pore per nucleus
44. Undifferentiated cell/egg → 30,000
45. Differentiated cell/erythrocytes → 3-4

Prokaryotes
46. Bacteria
47. Blue green algae (cyanobacteria) ETEA

Eukaryotes
48. Protists(amoeba, paramecium and euglena)
49. Animals
50. Plants
51. Fungi

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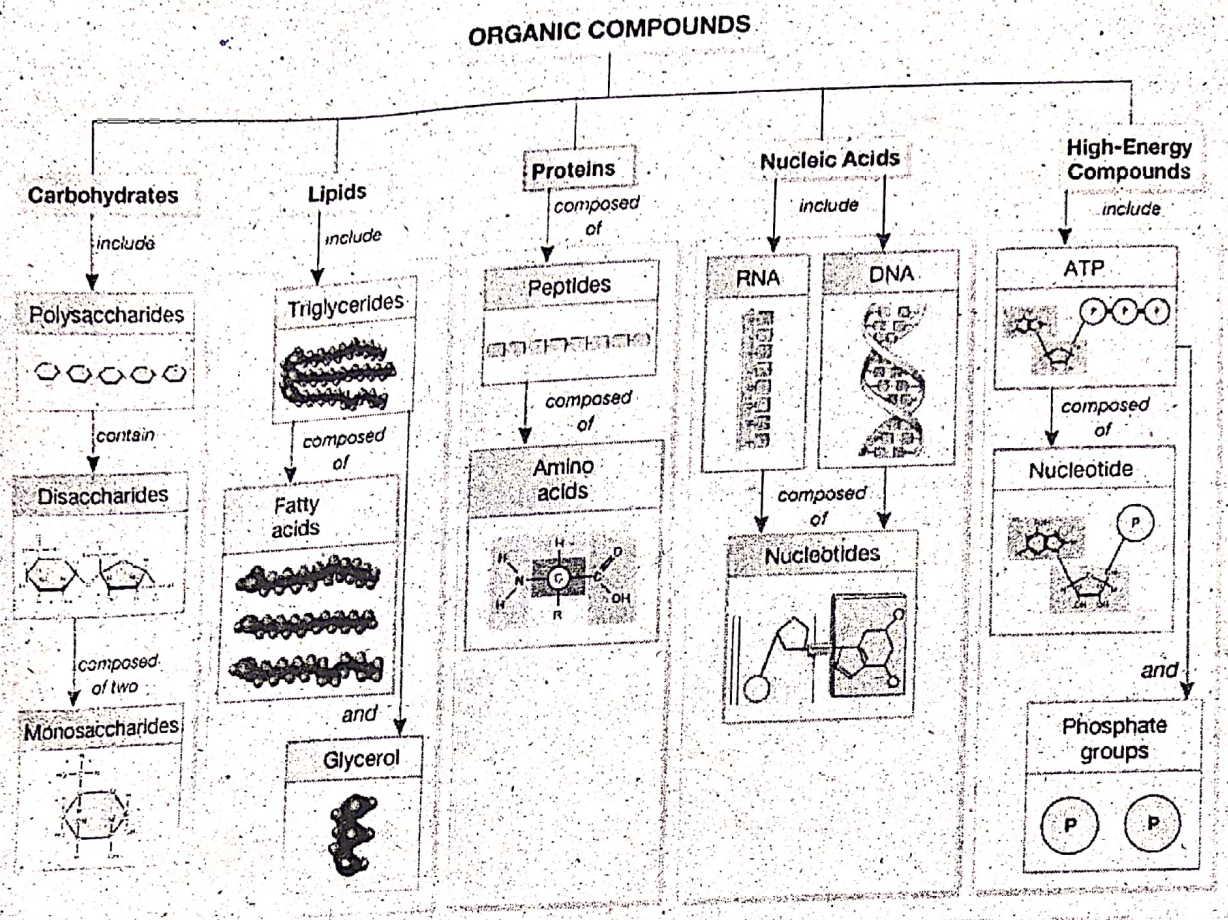
CHAP# 2 Biological Molecules



S.No	Questions	Answers
	BIOLOGICAL MOLECULES	
52.	The only living prokaryotic organism is	Cyanobacteria
53.	Most abundant component of protoplasm are	H_2O→protein→carbohydrates
54.	In aldehydes the double bond is present at	1st carbon atom
55.	In ketones the double bond is present at	2nd carbon atom
56.	**ETEA-2015**	

Contents	Bacterial cell %	Mammalian cell %
Water	70	70
Enz-hormones	2	2
Inorganic ions	1	1
Proteins	15	18
Carbohydrates	3	4
lipids	2	3
DNA	1	0.25
RNA	6	1.1

57.	In sickle cell hemoglobin glutamic acid is replaced by	Valine **ETEA-2012**
58.	Proteins are made of	Amino acids **ETEA-2014**
59.	Carbohydrates are made of	Sugar molecules
60.	DNA and RNA are made of	Nucleic acid
61.	Carotenoids are of two types	Carotene and

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		xanthophyll ETEA-2012
62.	In DNA spiral stair case wound around a	Central axis ETEA-2008
63.	Diameter of DNA	2nm
64.	Avery, McLeod and McCarty to their experiment in	1944 ETEA-2013
65.		

Monosaccharides	Aldehydes	Ketones
Triose	Glyceroaldehyde	Dehydroxyacetone
Tetrose	Erythrose	Erythrolose
Pentose	Robise	Ribulose
Hexose	Glucose	Fructose
Heptose	Glucoheptose	sceloheptose

66.	Function of smooth endoplasmic reticulum	Lipid synthesis NMDCAT-2020
67.	Maltose ,lactose and sucrose are	Disaccharides ETEA-2005 & 2012
68.	Monosaccharides are named which end with	- ose
69.	Fats composed of fatty acid and glycerol are converted for storage by process	Lipogenesis
70.	If glucose energy levels are low, stored are converted to glycerol and fatty acid by a process called	Lipolysis
71.	Surplus amino acid in the body are broken down to form urea in	Liver

CARBOHYDRATES

72.	Monosaccharides have carbon that may contain	3-7 carbon atoms
73.		

Oligosaccharides	Source	Components
Maltose	Fruits	Glucose + Glucose
Lactose	Milk	Glucose + Galactose
Sucrose	Sugarcane	Glucose + Fructose ETEA-2015

74.	Monosaccharides contain	One sugar molecule
75.	Oligoscachharides contain	2-10 Monosaccharides ETEA-2015
76.	Polysaccharides contain	More than 10 Monosaccharides
77.	Starch,cellulose,glycogen and chitin are	Polysachharides ETEA-2012
78.	Cellulose and Chitin are	Not digestible
79.	The amount of glucose present in per 100 ml of blood is	100 mg
80.	Types of amino acids	20
81.	Number of monosacharides in oligosachharides	2-10
82.	Grapes contain	27% glucose
83.	Haemoglobin consists of	4 polypeptide chain ETEA-2013

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84.	Insulin consists of	2 polypeptide chain

LIPIDS

85.	Saturated fatty acids have only	Single bonds ETEA-20177
86.	Unsaturated fatty acids have	Double or triple bond
87.	Acylglycerol with saturated fatty acids such as Palmatic Acids are fats present in	Animals
88.	Unsaturated fatty acids such as Oleic Acids are oils stored in	Plants NMDCAT-2020
89.	The cell wall of bacteria is one exception, they contain	Right handed sugar

PROTEINS

90.

Types of proteins

(1) Fibrous proteins	(2) Globular proteins
Keratin (hair,nails and outer skin) ETEA-2013	Haemoglobin
Myosin (in muscle cells)	Enzymes and cell membrane proteins
Collagen (skin, ligaments, tendons and bones) ETEA-2009	Antibodies and egg albumen

91.	The structure of haemoglobin is	Quaternary structure
92.	The number of carbon atoms present in fatty acids in per molecule	16-18 or 4-36
93.	Proteins are mode of H, NH_3,COOH and	R group
94.	Enormous proteins are due to	R group ETEA-2005
95.	In sickle cell anemia, glutamic acid is replaced by	Valine ETEA-2005

ETEA-2013

	Polysaccharide	Found in	Branching
96.	Starch	Plants	Branched + Unbranched
97.	Glycogen	Animals ETEA-2019	Branched
98.	Cellulose	Plants	Unbranched
99.	Chitin	Animals	Amino group (containing)

NUCLEIC ACIDS

101.	AMP,ADP and ATP	Mononucleotide ETEA-2009
102.	NAD,NADP,FAD	Di nucleotide NMDCAT-2020
103.	RNA and DNA	polynucleotides
104.	Each steroid is formed of four fused carbon rings containing	17 Carbon atoms
105.	Waxes contain	Monohydroxy alcohol ETEA-2014
106.	The unit of Terpenoids are	Isoprenoid Units
107.	The human body break beta-carotene to form two molecules of	Vitamin A
108.	In DNA the bond between Adenine(A) and Thiamine(T) is	Double hydrogen bond
109.	In DNA the bond between Cytosine(C) and Guanine(G) is	Triple hydrogen bond

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		ETEA-2012
110.	Thyamine is absent in	RNA ETEA-2005
111.	Anticodon of UAG will be	AUC
112.	The gametophyte of Ulva is	Haploid
113.	The enormous diversity of protein in mostly due to the diversity of	R group ETEA-2010
114.	Adenine are linked with pentose sugar forming a structure called	Adenosine
115.	$ATP+H_2O \rightarrow ADP + P +$	+7.0 K Cal ETEA-2015
116.	When two nucleotide are joint together, they form structure called	Dinucleotide
117.	If dinucleotide contains adenine as nitrogenous base, then it is called	Adenine dinucleotide
118.	Adenine dinucleotide in combination with vitamins form	Co-enzymes
119.	Nicotinamide is vitamin called	Nicotinic acid (niacin)
120.	Flavin is vitamin called	Riboflavin (Vitamin B12)
121.	A code is a sequence of three nitrogenous bases along with	Sugar phosphate strand
122.	Molecule formed from two different molecules belonging to different categories	Conjugated molecules
123.	If the co-factor has non-protein like a metallic ion, it's termed as	Prosthetic group
124.	Some co-factors are small organic molecules called	Coenzymes
125.	Lack of vitamin B produce	Beriberi
	CONJUGATED MOLECULES	
126.	Lipoproteins	Lipids & proteins
127.	Nucleoproteins	Nucleic acids & proteins
128.	Glycoprotein	Carbohydrates & proteins
129.	Glycolipid	Carbohydrates & lipids
130.	Lipprotein	All types of membranes
131.	Nucleoprotein	Chromosomes
132.	Glycolipid	Acidic + Water soluble
133.	Glycoprotein	Brain and plasma membrane
		Egg albumin + plasma membrane

Non polar aliphatic R group

134. Glycine
135. Alanine
136. Valine
137. Leucine
138. Methionine
139. Isoleucine

Polar unchared R group

140. Serine
141. Threonine
142. Cysteine
143. Proline
144. Asparagine
145. Glutamine

Aromatic R group

146. Phenyl alinine
147. Tyrosine
148. Tryphtophan

Positive charged R group

149. Lysine
150. Arginine
151. Histidine

Negatively charged group

152. Aspartate
153. Glutamate

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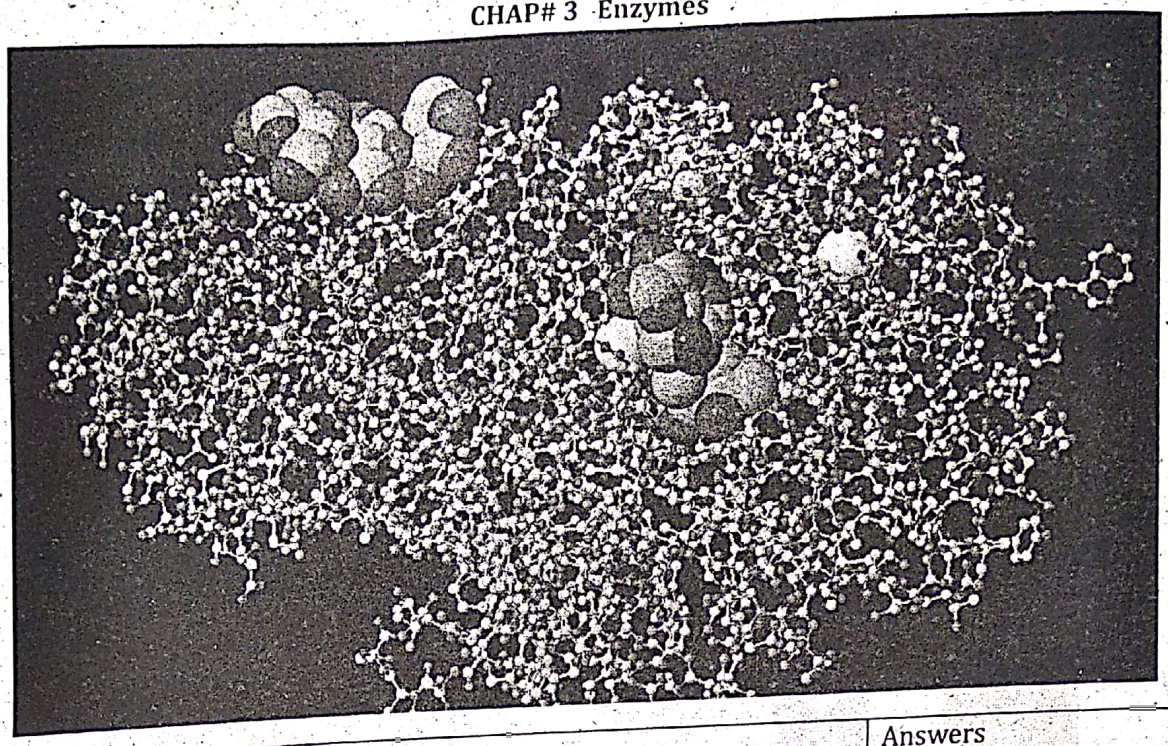
CHAP# 3 Enzymes



S.No	Questions	Answers
	ENZYMES MODEL	
154.	H.I.V contains	Two RNAs ETEA-2012
155.	Enzyme are basically	Proteins ETEA-2012
156.	HIV is also known as	AIDs
157.	The genetic material of plant viruses are mostly	DNA
158.	Enzyme decrease the	Activation energy NMDCAT-2020 ETEA-2009
159.	Poisons like cyanide, heavy metal ions and some insecticides all are	Non-competitive inhibitors
160.	Apoenzyme is an inactive enzyme without its	Cofactor
161.	Lock and key model was suggested by	Fischer in 1890
162.	The attraction of enzyme and substrate form	Enzyme-substrate complex
	ENZYME NOMENCLATURE	
163.		

Enzyme type	Examples
Oxidoreductases	Oxidases Oxygenases Peroxidases
Transferases	Transcorboxylases Transmethylases
Hydrolases	Esterases Phosphatases Peptidases
Lyases	Decorboxylases

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Isomerases	Deaminases ETEA-2019
Ligases	Epimerases Mutases

164.	In any chemical reaction a substrate is converted into	Productes
165.	Rate of enzyme reaction is affected by temperature, concentration of enzyme and substrate, inhibitors and	PH ETEA-2015

FACTORS AFFECTING RATE OF ENZYME REACTIO

166. Ph

Protease	1
Pepsin	1.5- 1.6 ETEA-2008
Invertase	4.5
Catalase	7
Urease	7 ETEA-2019
Trypsin	7.8-8.7
Lipase(Stomach)	4-5
Lipase (castor oil)	4.7
Lipase (pancrease)	8
Amylase(malt)	4.6-5.2
Amylase(pancrease)	6.7-7.0

Common optimum temperature values: NMDCAT-2020

Enzymes of	Optimum temperature
Arctic snow flea	-10° C
Mammalian	40° C
Thermophilic bacteria	90° C

167.	Lack of vitamin B produces	Beriberi ETEA-2011
168.	If co-factors ate non-metallic, these are termed as	Prosthetic group
169.	If the co-factor is small organic molecule it's termed as	Coenzymes
170.	The absence of cofactors leads to deficiency disease of	Mineral and vitamin
171.	Most enzyme end with suffix	ase ●exc: pepsin & trypsin
172.	Enzyme concentration increases enzyme activity	Linearly
173.	Poisons like cyanide, heavy metal ions & some insecticides are all	Non-competitive inhibitors
174.	In feedback inhibition, there is second binding site on which	Inhibitors binds
175.	The absence or presence at second binding site	Activate/deactivate enzyme
176.	Inhibitors are usually	Product of reaction
177.	On substrate concentration the rate of enzyme catalyzed reactions show	Curved dependence

Enzyme

178. Substrate → lock

179. Enzyme → key

180. Cofactors are Atoms, Group of atoms or Molecules

181. Non protein → prosthetic group (copper, zinc, iron)

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182. Organic → coenzymes

Six enzyme categories

1. Oxidoreductae
   a. Oxidase
   b. Oxigenase
   c. peroxidase
2. Transferase
   a. Transcarboxylase
   b. transmethylase
3. Hydrolases
   a. Esterase
   b. Phosphatase.
   c. peptidase
4. Lyases
   a. Decarboxylase
   b. deaminase
5. Isomerases
   a. Epimerases
   b. mutases
6. ligases → bond formation between substrate moleucles

Temperatures

183. mammalian enzyme → 40°C
184. arcitic snow → -10°C
185. thermophilic bacteria → 90°C
186. Q10 → relatice increase for 10°C
187. Rate is not 0 at 0°C

188. Rate of react depends upon enzyme conc. Linearly.
189. Rate of reaction on substrate conc. Curvely.

190. Hydrogen peroxide to water and o→ 96Kj/mol
191. Enzmyes and cofactors are not permanently altered

192. Inhibitors → product of reaction
193. competitive inhibitor →sulphonamide to antibiotic drug
194. non-competitive inhibitor →posisons like cyanide, heavy metal ions and some insecticides

Since 2016

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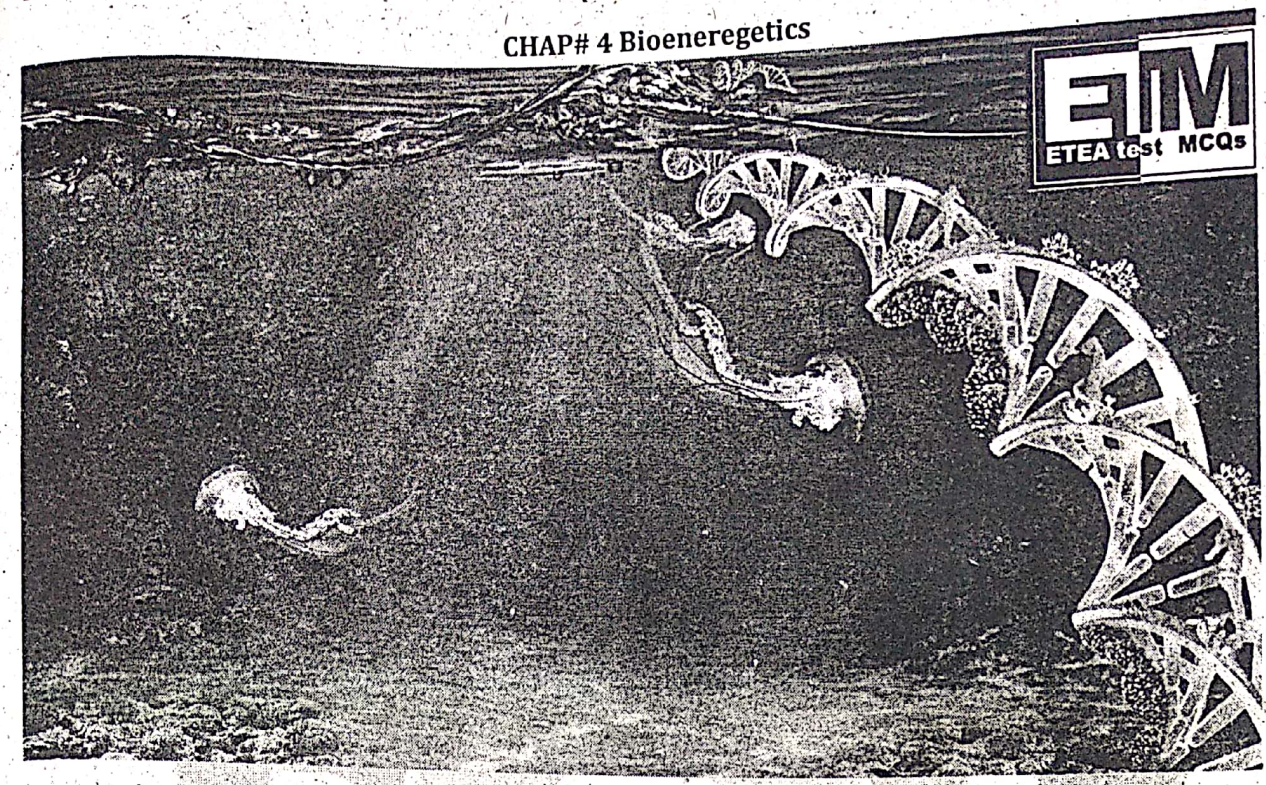
CHAP# 4 Bioeneregetics



S.No	Questions	Answers
	Role of sunlight in photosyntheises	
195.	Shorts wavelength are more energetic than	Long wavelength
196.	Chlorophyll appear green, because they reflect green colour, so grean colour, for photosynthesis is	Less important ETEA-2005
197.	Visible light ranges from	390 nm – 760 nm
198.	Wavelength shorter than visible light	Ultraviolet
199.	Wavelength longer than visible light	Infrared
200.	Infrared can not affect	Photosynthetic process
201.	Total sunlight that enters to atmosphere and reaches to the earth surface	40 %
202.	Chlorophylls absorb light of violet blue wavelength (390-430 nm) and	Red wavelength (670-700 nm) ETEA-2019
203.	Carotenoids (accessory pigments) absorbs light of wavelength	500-600 nm
	Photosynthetic pigments	
204.	Light reaction takes place in	Thylakoids ETEA-2015
205.	Dark reaction occurs in	Stroma ETEA-2008
206.	Photosynthetic bacteria lack	Chloroplasts
207.	Chlorophyll in photobacteria is attachehd to	Cell membrane
208.	Chlorophyll "a" is present in all green plants except	Bacteria
209.	Chlorophyll "b" is present in higher plants and	Algae
210.	Chlorophyll "c" ,"d" and "e" are present in	Various groups of algae
211.	Chlorophyll conatian	Magnesium ETEA-2012
212.	Bacterio- Chlorophyll is only present in	Bacteria
213.	Long hydrocarbon chain attached to pyrrole rings is called	Phytol side chain

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214.	The four rings (tetra pyrrole rings) are collectively called	Porphyrin
215.	In chlorophyll a the group attached to prophyrine group is	Methyl group (CH_3). **ETEA-2013**
216.	In chlorophyll b the group attached to prophyrine group is	carbonyl group (CHO) **ETEA-2014**
217.	Chlorophyll a has methyl group(CH3) and formula of	$C_{55} H_{72} O_5 N_4 Mg$
218.	Chlorophyll b has carbonyl group(CHO) and formula of	$C_{55} H_{70} O_6 N_4 Mg$ **ETEA-2017**
219.	Carotenoids include	Carotenes & xanthophylls
220.	Carotenoids are yellow, orange, red or	Brown pigment **ETEA-2015 & 2016.** **Forumula: YORB**
221.	Carotenoids protect chlorophyll from intense light and	Oxidation by oxygen
222.	Carotenoids absorb light and transfer it to	Chlorophyll a
223.	Instrument that measure amount of light passed	Spectrophotometer
224.	We can measure the rate of photosyntheise by measuring the amount of	Oxygen produced
	Light reaction (light dependent reaction)	
225.	Thylakoids contains chlorophyll a, b and	Carotenoids **ETEA-2013**
226.	Forming ATP from ADP and inorganic phosphate using sunlight energy is called	Photphosphorylation **ETEA-2014**
227.	The ATP synthesis during Non-cyclic electron transport flow is called	Non-Cyclic Photphosphorylation
228.	The ATP synthesis during Cyclic electron transport flow is called	Cyclic Photphosphorylation
229.	The 1st product of photosynthesis is	PGA
230.	Aerobic respiration is also called	Cellular respiration
231.	Photosystem consists of many hundreds chlorophyll a, chlorophyll b, carotenoids and	Electron accepter
232.	Photosystem I absorb light of	700 nm
233.	Photosystem II absorb light of	680 nm
234.	Reaction centre conisists of primary electron acceptor and	Reaction centre chlorophyll
235.	On absorbing light, electron from photosystem is lost from	Chlorophyll
236.	Van Neil hypothesized that plant split water to release oxygen in	1930 **ETEA-2014**
237.	In glycolysis phosphate is gain by NADH and is converted to	$NADPH_2$
238.	In non cyclic electron transport chain, ATP is produced by energy loss between cytochrome	B and f
239.	Cyclic elctron transport occurs in	Rare conditions
240.	Cyclic electron transport of light reaction involves	Photosystem 1
241.	Product of lght reaction are	NADPH+ATP **ETEA-2014**
242.	ATPs produced in non-cyclic photophosporylation are	4 **ETEA-2015**
	Dark reaction	
243.	Dark reaction is also called	Calvin cycle

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244.	Dark reaction takes place at	Day and night
245.	The most common protein in nature	Rubisco
246.	Ribullose bisphosphate carboxylase is also called	Rubisco
247.	First product of photosynthesis to be identified is	PGA
248.	In reduction process fixed carbon is reduced to a 3-carbin suger molecules of	PGAL
249.	Five PGAL are recycled to regenerate 3 molecules of	RuBP ETEA-2015
250.	For suger molecules, the number of PGAL used are	One
	Respiration	
251.	Total ATP produced in glycolysis	4
252.	Net gain of ATP in glycolysis	2
253.	The number of ATP formed directly by a single Krebs cycle is	1 ETEA-2012
254.	Total ATP produced in respiration of glucose is	36
255.	Glycolysis occur in cytosol while Krebs cycle & electron transport chain occur in	Mitochondria ETEA-2013
256.	The non-cyclic electron transport is also called	Zigzag Scheme
257.	Dark reaction is also called	Calvin-benson cycle
258.	In carbon fixation RuBP combine with CO_2 forming 6-carbon compound which splits to	Two Posphoglycerate (PGA)
259.	In reduction process carbon is reduced to a 3 – carbon molecules	PGAL
260.	Out of six PGAL, only one molecule is used for making	Glucose
261.	Five PGAL molecules are recycled to generate	3 molecules of RuBP
262.	In preparatory phase of glycolysis, the glucose splits into	PGAL & DAP
263.	End product of glycolysis is	Two pyruvate
264.	In glycolysis electron is gain and form water by	Oxygen ETEA-2012
265.	The generation of ATP in process of glycolysis is called	Substrate level Phosphorylation
266.	The end product of glycolysis is	2 molecules of Pyruvate ETEA-2013 NMDCAT-2020
267.	In Kreb's Cycle or TCA cycle, Acetyl CoA is completely oxidized into	2 molecules of CO_2
268.	Coenzyme A consist of a nucleotide and a portion of one of the	B vitamins
269.	Nine acetyl group generate	108 ATP molecules
270.	Anaerobic respiration yields	2 ATP molecules
271.	The simplest amino acid is	Glycine
272.	Sugar cane and maize are	C_4 plants ETEA-2014
273.	Chlorophyll a absorbs	Blue light
274.	Chlorophyll b absorbs	Red light
275.	Plant cell synthesize sugar in the	Grana ETEA-2012
276.	Conversion of excess glucose into fat is know is	Lipogenesis
277.	DNA have one oxygen less than	RNA
278.	Redox reaction occur in photosynthesis and	Respiration

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279.	Sucrose sugar is considered as	Oligosaccharide
280.	Chlorophyll is protected from intense light by	Carotenoids
281.	Sequence of nucleotide bonded to TATGA is	ATACT
282.	Some hormones are composed of	Lipids
283.	Magnesium is attached to center of porpyrine ring of	Chlorophyll
284.	During cellular respiration $NADH_2$ produces	3 ATP **ETEA-2010**
285.	During cellular respiration $FADH_2$ produces	2 ATP
286.	Fatty acids are converted into carbohydrates by	Glyoxisomes
287.	In chromosomes, the material controlling heredity is;	DNA
288.	The common cytochrome in both photosynthesis and respiration is	Cyt "b"
289.	Anticodon of AUG will be	UAC
290.	Peptide bond is formed between carbonyl group and	Amino group **ETEA-2008**
291.	What happen to oxygen in electron transport chain	It reduce to water **ETEA-2005 & 2008**
292.	Glycolysis occur in	Cytosol(cytoplasm)
293.	Kreb's cycle or Tricarboxylic Acid Cycle(TCA) occur in	Mitochondria
294.	Electron transport chain occur in	Mitochondria
295.	Light reaction occur in	Granum of chloroplast
296.	Dark reaction or Calvin cycle occur in	Stroma of chloroplast
297.	The step in glycolysis in which transfer of energy is not involved is	Fructose diphosphate → Dap
298.	Photorespiration occur when inside leaf concentration of	CO_2 is high **ETEA-2006**
299.	The process responsible for production of energy is	Respiration
300.	Chemiosmosis takes place in	Mitochondria **ETEA-2014**
301.	RuBP + O_2 → Glycolate → glycine → serine + CO_2	Photorespiration **ETEA-2016**
302.		

C3 PLANTS	C4 PLANTS
PGA	Oxaloacetate
Rubisco	Pepco
Chloroplast is in mesophyll tissues	Chloroplast is in mesophyll tissues and bundle sheat cells
Mesophyll cells carry calvin cycle	Mesophyll fix CO2 Bundle sheet cells produce calvin cycle producing glucose

Chlorophyll

303. A→ all green plants except bacteria
304. B→higher plants and green algae
305. C,D,E→ various groups of aglae
306. Bacteriochlorophyll → bacteria
307. Chl a → CH_3 → C55 H72 O5 N4 Mg
308. Chl b → CHO → C55 H70 O6 N4 Mg **ETEA**

Photosystem **ETEA-2019**

309. Antenna comple → chl b + carotenoids **ETEA**
310. Reaction centre → chl a + primary electron acceptor + electro carrier

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ATP production by

311. Light reaction → photophosphorelation **NMDCAT-2020**

312. Non- cyclic transport → non-cyclic photophosporelation

313. Cyclic electron transport → cyclic photophosporelation

314. Glycolysis → substrate level phosphorelation

315. Light reaction → thylakoids **ETEA** **NMDCAT-2020**

316. Dark reaction → stroma

317. Glycvolysis → cytoplasm

318. Kreb's cycle → mitochondria **ETEA**

319. Electron transport chain → mitochondria

320. Co A = nucleotide + B vitamin

321. Glycerol → PGAL → glycolytic pathway

322. Fatty acids → acetyl group → kreb cycle **ETEA**

323. Oleic acid (18 C) → 9 acetyl group→ 108 ATP

Anaerobic respirain

Lactic acid fermentation

324. Muscles of human and many microorganism

325. Pyruvic acid → lactic acid

Alcoholic fermentaiotn

326. Microorganism

327. Pyruvic acid → acetaldehyde → ethyl alcohol **ETEA**

Photorespiration

328. RuBp+ O → glycolate (stoma) **ETEA**

329. Glycolate → glysine (peroxisome) **ETEA**

330. Glysine → serine + CO_2 (mitochondria)

C4 photpsyntheises

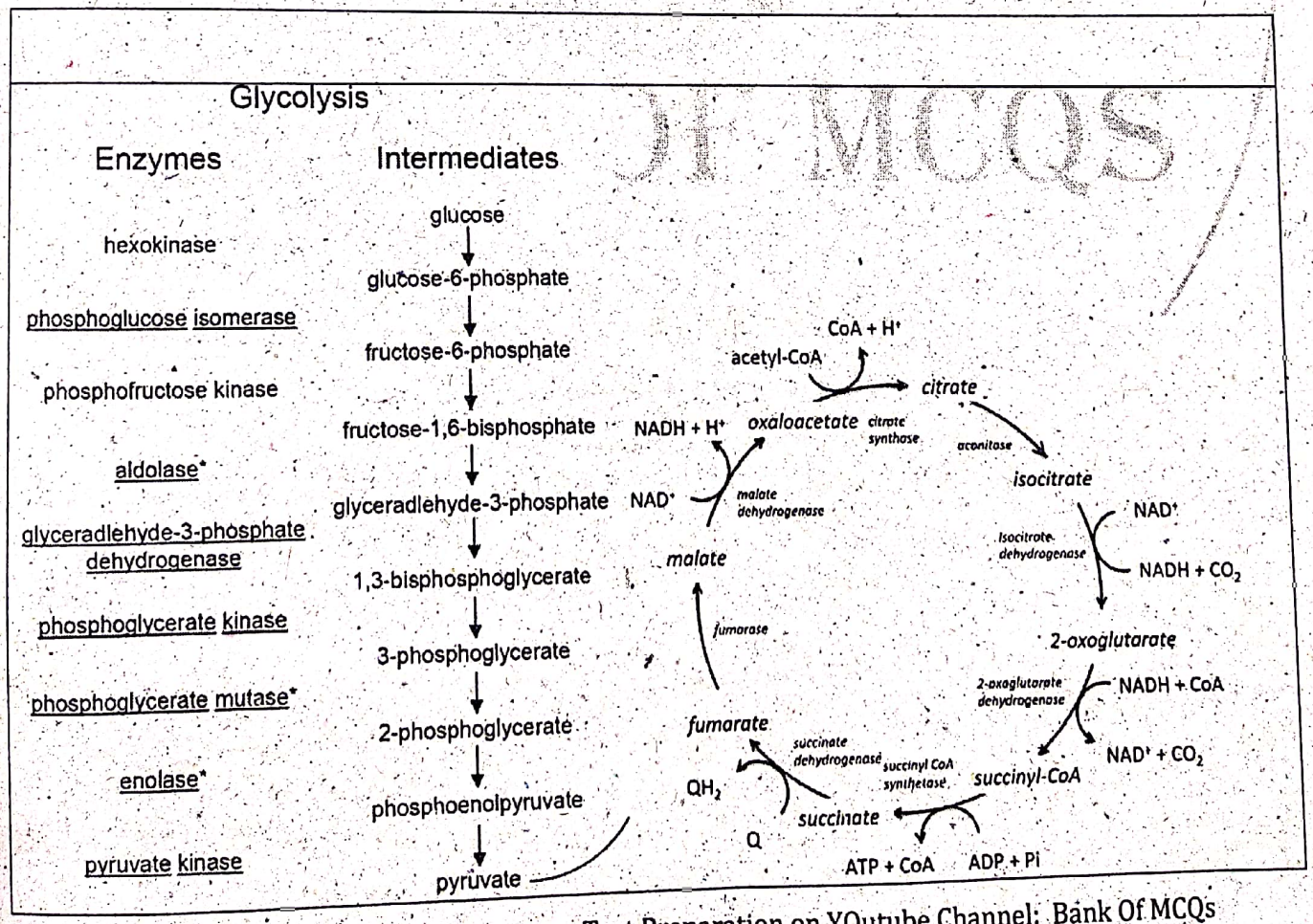
331. RuBP+CO_2 → PEP → malate

332. Malate + CO_2 to bundle of sheet where calvin cycle proceeds. **ETEA**

333. C4 plants → suger cane and maze **ETEA**

334. C4 pants → photosyntheisses remains high when stomata closed and temperature is high and the rate of CO_2 fixation is also high as compared to c3.

335. C4 plants fix co2 and reduce rate of photorespiration **ETEA**



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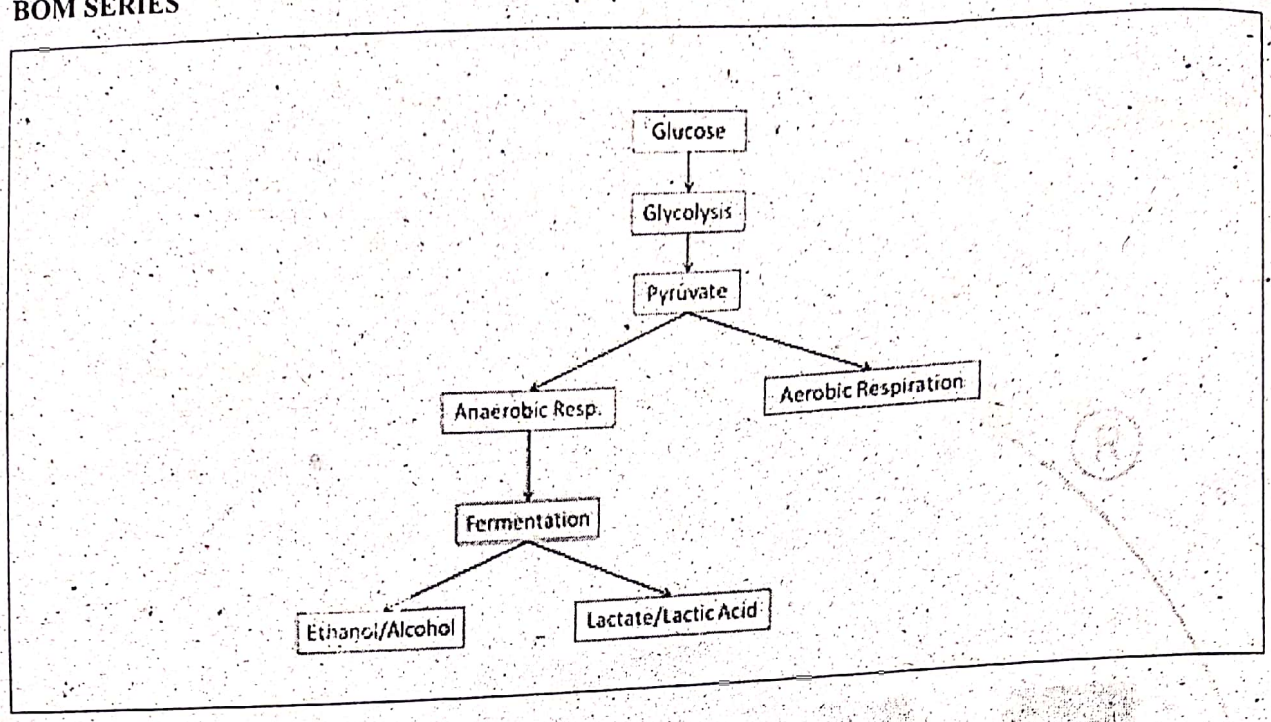

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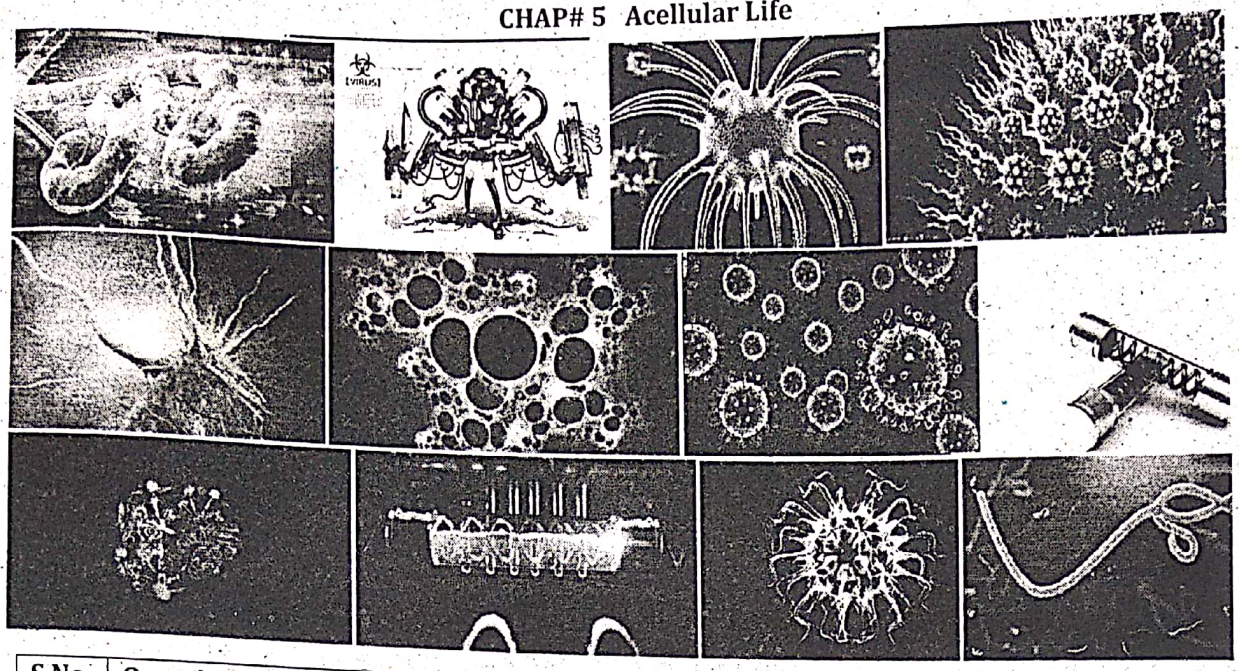
CHAP# 5 Acellular Life



S.No	Questions	Answers
	STRUCTURE OOF SOME REPRESENTATIVE VIRUS	
336.	In HIV the proteins gp120 and gp41 together makes the	Spikes
337.	In HIV the proteins p117 make the Matrix and p24 together makes the	Core
338.	HIV belongs to special class of virus called Retrovirus, within this class it is in	Subclass Lentivirus
339.	Three HIV genes gag, pol, and env code for Protein syntheises for new	HIV particles **ETEA-2012**
340.	Six HIV genes tat,rev,nef, vif,vpr,and vpu code for protein that control the ability of	Infection
341.	2 Glycoprotein molecules, known as hemagglutinin(HA) and Neuraminidase(NA) are stuck on liquid envelop of	Flu Virus
342.	Flu Virus belongs to	Enveloped group of virus
343.	Flue virus has single strand	RNA **ETEA-2019**
344.	HIV genes that carry information for protein synthesize	gag, pol & env **ETEA-2017**
345.	HIV genes that have ability for infection	tat, rev, nef , vif, vpr & vpu
346.	RNA strand which help HIV replication is	Long terminal repeat
347.	8 separate pieces of RNA make up	Influenza virus genome
348.	Hepatitis B spreads through	Infected body fluids
349.	HA is rod shaped triangular molecule while NA is Mushroom shaped spike on	Flu virus they are present
	LIFE CYCLE OF BACTERIOPHAGE	
350.	Lytic cycle is also called	Master-slave relation
351.	Lysogenic cycle is also called	Guest –host relation
352.	When a virus securely attach to host cell in good conditions	The infection

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		begins
353.	The type of life cycle in which bacterium cell burst are called	Lytic cycle
354.	Phages can be used as	Cloning vectors
355.	Cloning vectors are capable of replicating inside	Living organisms
	AIDS AND HIV INFECTION	
356.	AIDs is caused by	HIV or AIDs virus **ETEA-2012**
357.	There are two types of lymphocytes	B and T cells
358.	B cells release	Antibodies **NMDCAT-2020**
359.	T cells directly	Attack and destroy cell
360.	HIV contain	2 RNAs, **ETEA-2011**
361.		

Hepatitis	Nuclei Acid
Hepatitis A	RNA
Hepatitis B	DNA
Hepatitis C	RNA

362.	There are two types of T cells	Helper and killer
363.	Helper T cell	Recognize antigen
364.	Killer T cell kill the	Antigen
365.	HIV can only replicate inside	Human beings
366.	Bacteropphage only replicate inside	Bacteria **ETEA-2019**
367.	HIV have special carriers on its surface called	CD4
368.	Viral DNA integrated into human DNA by HIV enzyme called	Integrase
369.	The enzyme present in phage which digest cell wall of bacteria is called	Lysosome
370.	T cells are also called CD4 cells or CD4 T cells or	CD4 cell lymphocytes
371.	Enzyme that convert the viral RNA into DNA is	Reverse Transcriptase **ETEA-2017**
372.	The combine DNA formed from human and viral DNA is called	Provirus
373.	Anti-HIV are also called	Antiretroviral
374.	3 or more anti-HIV medications(HAART) are known as	Cocktail
	SOME OF THE VIRAL DISEASES	
375.	Hepatitis means inflammation to	Liver **ETEA-2014**
376.	Hepatitis A is also called	Infectious hepatitis
377.	Hepatitis B is also called	Serum hepatitis
378.	Herpes is caused by	Herpes simplex virus type 1,2
379.	poliomyelitis is caused by	Poliovirus
380.	Leaf curl diseases of cotton is caused by	Complex of begomo virus
381.	Transmissible neurodegenerative diseases is caused by	Prions
382.	Hepatitis D is caused by	Viroids **ETEA-2015**

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383.

Disease	Incubation period
leaf curl disease/syphillis	2-3 weeks ETEA-2016
Hepatitis A	2 – 6 weeks
Hepatitis B	4 – 20 weeks ETEA-2019
Hepatitis C	2 – 26 weeks
Polio	5 – 35 days (avg=7-14 days)

384.	There is no medications used to treat	Hepatitis A
385.	Polio cause	Muscle paralysis
386.	Leaf curl disease of cotton are transmitted by	Whitefly *Bemisia tabaci*
387.	Pox virus is the	Longest virus
388.	Antibiotics can be used for	Urinary track infections
389.	Bethanechol can be used for	Urinary retention
390.	Polio immunization vaccine is effective upto	90% ETEA-2017
391.	Leaf curl disease of cotton is caused by	Begomovirus species ETEA-2017
392.	Leaf curl disease are transmitted by whitefly called	Bemisia tabaci
393.	Most animals ans plants viruses are	RNA ETEA-2016
394.	The only genus of bacteria which lack Cell walls is	Mycoplasma
395.	The phage contain an enzyme which digest was of bacterium called	Lysosome
396.	HIV is	RNA virus ETEA-2015

397. Life cycle of bacteriophage

Lytic cyle	Lysogenic cycle
Master-slave relation Virus → lysozyme	Guest-host relation Lyso → lytic

Lymphocytes / WBCs		
B cells	T cells	
Produce antibodies	Helper	Killer

Disease	Incubation period
leaf curl/ syphilis	2 – 3 weeks
Hepatitis A → RN	2 – 6 weeks
Hepatitis B DNA	4 – 20 weeks
Hepatitis C → RNA	2 – 26 weeks
Polio	5 – 35 days (avg=7-14 days)
HIV	6-12 weeks

398. Small fox

Human viruses ETEA

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399. Polio
400. Influenza
401. Hepatitis
402. HIV
403. Measles
404. Severe acute respiratory syndrome
405. Coronavirus

406. Bacteria replication time → 20 min
407. Virus replication time → 70 sec
408. Visus discover by iwanosky in 1892
409. Most animal virsuses are RNA ETEA

410. Virus characteristics
a) Living characteristics
411. DNA-RNA
412. Mutation
413. Genetic recombination
414. Infections
415. irritability
b) Non-living cvharacteristics
416. Subcellular, non-cellular
417. No respiration
418. No excretrion
419. Can be crystallized
420. Store as chemical

421. Virus classfification
a) Morphologica basel types
422. Spherical → polio ETEA
423. Tadpole → bacteriophage
424. Rod shape→ tobacco mosaic virus ETEA
b) Host base types
425. Animal virus
426. Plant virus
427. Bacteria virus

bacteriophage
428. Length → 24-200nm
429. 20 icosahedral
430. DNA or RNA

FLU/influenza virus
431. Round, spaghetti like shape
432. Enveloped group
433. RNA → 8 pieaces ETEA-2019
434. Each RNA → 1or2 proteins specifies
435. Segmented nature of RNA
436. Heemagglutanin(HA)→ rod shape triangular
437. Neuroaminadase(NA) or siladase → mashroom shape spike

HIV
1. 72 spikes made of Gp 120 and gp 41.
2. Matrix → p17
3. Core → p24
4. 2 RNA strands
5. Reverse transcriptase, integrase, protease
6. Sub group of lenti virus
7. Lent→ SIV,FIV,Visna and CAEV

Life cycle of HIV ETEA
438. Attachment → onCD4 cells
439. Penetration
440. Replication
441. Assembly
442. Lysis

443. HIV+cell virus → proviruse ETEA
444. Without treatment , HIV develops in 8-10 year
445. With treatment , it takes 15 years or more to develop AIDs ETEA

Opertunistic invasions ETEA
446. Pulmonary tuberculosis
447. Candidiasis of eosophagus, trachea, bronchi and lungs
448. Taxoplasmosis of brain
449. Severe bacterial infection
450. Recurrect pneumonia

451. HAART → cocktail → 3 or more drugs ETEA-2015

Hepatitis
452. A → infectious + no chromic liver disease
453. B → serum, + cause liver cancer
454. C → chronic liver disease + two drugs which is 50% useful
455. Diagnosis → blood test

Polio treatment ETEA
456. Antibiotics for urinary track iinfection
457. Bethanechol for urinary retention
458. Moist heat to reduce muscle pain and spasms
459. Pain killer to reduce pain
460. Norcotics are not given due to risk of breathing difficulty

461. Hep C treatment of 2 drugs 50% effective
462. Polio vaccine → 90% weffective

463. Leaf curl diease cause → begomovirus ETEA

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464. Leaf curl transmitted by → bemisia tabaci

465. Prions are infectious proteins NMDCAT-2020

466. Codes in host brains that if normal would become neuns

467. In scarpie the CAN of sheepand goats are affected

Severe prion diseas ETEA

468. SJD → Crutzuld-jocab disease

469. GSS →Gertsmann-Stessahular –Schinker syndrome

470. FFI→ Fatal familia isomonia

Viroids

471. Simple than viruse

472. Small, circular, single stranded molecule of RNA ETEA

473. Lack proteins coat

474. Cause diseas like

475. Hep D ETEA

476. Potato spindle tuber disease

477. Cucumber pale fruit

478. Citrus exocortis disease

479. Cadang-cadand (coconuts)

480. First viroid → potato spindle tuber viroid (PSTV) I

481. PSTV → RNA that's secondary stuture has been established

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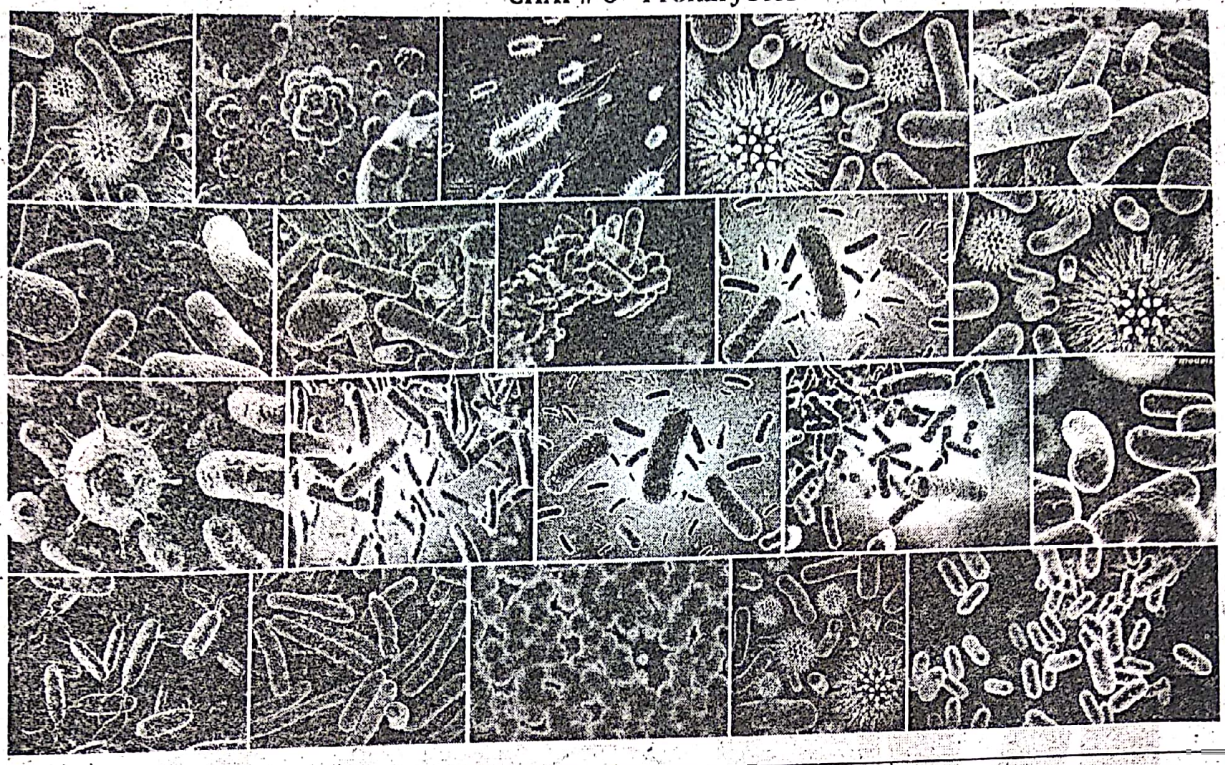
CHAP# 6 Prokaryotes



S.No	Questions	Answers
	PROKARYOTES	
482.	Nostoc are involved in fixation of	Atmospheric Nitrogen
483.	The oxgen producing bacterias	Cyanobacteria **ETEA-2013**
484.	A capsule that is less tightly bound to bacteria is called	Glycocalyx
485.	The resistant of gram negative bacteria from gram pasative bacteria is	more
486.	Flagella is made of protein called	Flagellin
487.	Cholera, Typhoid fever, Tuberculosis, Pneumonia are	Bacterial diseases **ETEA-2011**
488.		

Process	Temperature	Time	
Pasteurization	72 degree	15 sec	**ETEA-2014**
Ultra high temperature	140 degree	3 sec	
Sterilization	170 degree	2 hour	
Heating	100 degree	10 min	

*72-15—140-3

489.	Pilli is made of protein called	Pillin
490.	The domain is also called	Super kingdom
491.	No of prokaryotes to which scientific names are given	6300 species
492.	Three distinct domains of life are	Bacteria, Archaea &Eukaryotes
493.	It's believed that archaea and bacteria have same	Ancestors
494.	Archaea living in extreme conditions are called	Extremophilic **ETEA-2016**

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495.	Archaea living in moderate conditions are called	Methanogens
496.	Extremophilic are of two types	Halopiles & thermophiles
497.	Extreme halopiles live in	High-salt environment
498.	Extreme thermophiles live in	Hot environments
499.	The most abundant organism is	Bacteria
500.	Bacteria is used as agent in	Bioremediation
501.	Human insulin which is produced by recombinant technology is	Humulin
502.	Bacteria living in guts of herbivorous plants and help in digestion of	Cellulose
503.	Diphtheria, Tuberculosis, Pneumonia and Whooping cough are	Airborne Bacterial diseases
504.	Typhoid fever, Gastreoenterites, Dysentry, and Cholera are	Waterborne Bacterial diseases
505.	Botulism is	Foodborne Bacterial diseases
506.	Cholera is caused by gram negative bacteria called	Vibrio Cholera
507.	Typhoid fever is caused by rod shaped gram negative bacteria called	*Salmonella Typhi* ETEA-2010
508.	Tuberculosis is caused by acid-resistant bacillus bacterium called	*Mycobacterium tuberculosis*
509.	Pneumococcal pneumonia is caused by gram positive bacterium called	*Streptococcus Bacteria*

CLASSIFICATION OF BACTERIA

510. **Classification of bacteria:**

S.No	Types	Main characteristics
1	Proteobacteria	Gram negative bacteria Includes photoautotrophs, chemoautotrophs & heterotrophs Contain both aerobic & anaerobic bacteria
2	Chlamydias	Gram negative bacteria Parasitc bacterias
3	Spirochetes	Helical heterotrophic spiral bacterias
4	Gram-positive bacteria	Contain both solitary & colonial Subgroups: a: Actinomycetes (decomposers) B: Streptomyces (antibodies) Example : Mycoplasma
5	Cyanobacteria	Oxygen producing bacteria (1% to 21%) Example: Nostoc (nitrogen fixing bacteria)

Types pf Protobacteria :

Types	
Alpha Bacteria	Symbiotic association ETEA-2017
Beta Bacteria	Nitrogen recycling
Gamma Bacteria	Sulphur Bacteria ETEA-2016- ETEA-2019
Delta Bacteria	Slime secreting myxobacteria

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Epsilon Bacteria	Pathogenic

STRUCTURE OF BACTERIA

511.	The only genus of bacteria which lack cell walls	Mycoplasma (Gram-positive)
512.	The tight covering around the bacteria is called	Capsule
513.	A capsule which is less tightly bound to cell is called	Glycocalyx
514.	Cell wall of bacteria is made of peptidoglycan which is	Carbohydrate-protein complex

515. **Number of genes:**

HIV	9
Bacterium	500
yeast	6000
Human beings	20,000 – 25,000

516.	Division(Gram +ive and Gram -ive) of bacteria was done by	Hans Christian Gram (1884)
517.	Cell wall of gram negative bacteria is externally covered by	Layer of lipopolysaccharides

518. **Types of bacteria**

Types	Flagella
Atrichious	No
Monotrichious	Single
Lophotrichious	Groups of flagella at one end **ETEA-2019**
Amphitrichious	Groups of flagella at both ends
Peritrichious	Groups of flagella at all ends

519.	Cell membrane invaginates into cytoplasm to form pocket like projection called	Mesosomes
520.	In bacteria, chromosomes is located at specific region of cytoplasm called	Nucleoid
521.	Extra chromosomal rings found in bacteria are called	Plasmids

SIZE AND SHAPE OF BACTERIA

522.

Forms	Motion	Shape	Pairs	Chains
Cocci	Non-motile	Spherical	Diplococcic	Streptococci
Bacilli		Rod	Diplobacilli	streptobacilli
Spirilla	Motile	Screw		

523.	Some spirilla have less than one complete twist and are called	Vibrios
524.	Endospore are produced by	Gram positive bacteria

MODE OF NUTRITION IN BACTERIA

525.	Saprobes are also called recyclers of nutrients or	Scavengers of earth
526.	Parasitic bacteria which caused diseases are called	Pathogens

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527.	Bacteria is hydrogen sulphide while cyanobacteria like plants get hydrogen from	Water
528.	The disease symptoms appear during	Log phase ETEA-2015 ETEA-2019
529.	Streptococcus bacteria has two strains	S and R types
530.	Chemoautotrophs obtain their energy from	Inorganic substances
531.	Heterotrophic obtain their food from	Organic compounds
532.	Recyclers of nutrients or scavengers of earth are used for	Saprophytic Bacteria
533.	The recombinant DNA formed from bacteria and phage DNA is called	Prophage
534.	Archaeologists found live endospore from 7518 years old sediments of	Minnesota's lake
535.	Biotin(vitamin), Methionine(amino acid),Leucine(amino acid) and Theronine(amino acid) are essential for	Growth of bacteria
536.	In photoautrophs bacteria, the chlorophyll is dispersed in infolded region of	Cell membrane ETEA-2015
537.	The association of Rhizobium radiciola to roots of leguminous plants are	Symbiotic ETEA-2017
538.	A golden rice contain Beta carotene, a precursor of	Vitamin A
	BACTERIAL DISEASES	
539.	Bacteria used to produce transgenic plant is	*Agrobacterium tumefaciens*
540.	Bacteri uses for gene cloning is	*E.coli*

541.	**Disease**	**Cause**
542.	Bacterial leaf spot	*Pseudomonad spp.*
543.	Bacterial wilt	*Ralstonia solanacearum*
544.	Bacterial soft rot	*Erwinia carotovora*
545.	Bacteria galls	*Agrobacterium tumefaciens*
546.	Bacterial blight	*Xanthomonas campestris Pv. Phaseoli*

547.	TB patient are largely treated with Isonicotinylhydrazine(INH), rifampin, ethambutal and	Streptomycin
548.	Vaccine for TB is	Bacille Calmatte Guerin(BCG)
549.	Typhoid fever is transmitted by flies, food, fingers, feces and fomites or	5 fs
550.	The drug given to pneumonia patient is penicillin with tetracyaline or	Chloramphenicol
551.	Bacteria reproduce asexually by	Binary Fission ETEA-2014 ETEA-2019
552.	Bacteria reproduce sexually by	Transformation, Transduction & Conjugation ETEA-2019

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553.	Salmonella typhi causing typhi and Chlostridium tetani causing tetanus are	Bacilli bacteria
554.	Cholera, typhoid fever, tuberculosis(TB), pneumonia ,diphtheria, tetanus	Bacterial diseases
555.	The simplest oxygen producing organisms are	Cyanobacteria ETEA-2010
556.	When anopheles mosquito bites a healthy person, It injects	Sporozoites
557.	The pneumococcuc strain used by Griffah in his experiment was	Atrichous ETEA-2006
558.	Ascospore is produced as a result of	Sexual reproduction
559.	Gonorrhea is a sex diseases caused by	Bacteria
560.	The role of bacteria population in large intestine of man is	Cellulose breakdown ETEA-2005
561.	Bacteria is hydrogen sulphide while cyanobacteria get hydrogen from	Water
	GROWTH IN BACTERIA	
562.	Bacteria contain chlorophyll a while cyanobacteria contain chlorophyll a, phycocyanin, aalophycocyanin and	Phyceoerythrine
563.	In case of bacteria growth means increase in the	Total population
564.	Temperature, availibity of nutrients, PH and ionic concentration can effect	Growth in bacteria
565.	Under favorable conditions, bacteria divides after every	20 minutes
566.	The number of cells doubles ate the end of each division ,it is called	Exponential growth
567.	The growth of bacteria is	Exponential growth
568.	The duration between two successful divisions is called	Generation time ETEA-2015
569.	In division the growth does not appears in	Lag phase
570.	The lag phase is followed by period of fast growth called	Log phase ETEA-2015
571.	In asexual reproduction, mitotic structure	Does not form
572.	The genetic variation in bacteria is either achieved by	Mutation or genetic variation
573.	A fragment of DNA of recipient is replaced by DNA of donor, recipient is now	Called Recombinant cell
574.	Endotoxin is produced by bacteria when it dies in	Decline phase ETEA-2017
	SEXUAL REPRODUCTION IN BACTERIA	
575.		

Injected strain	Mouse then
R type	Live
S type	Die
Heat killed S type	Live
Heat killed S & R live	Die

576.	Piece of DNA is transported from one bacteria to another through a third party in	Transduction
577.	Phages which cause lytic cycle are called	Virulent phages
	BACTERIAL DISEASES	

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578.	Phages which cause lysogenic cycle are called	Temperate phage
579.	Conjugation was first studied by Luderberg & Tatum in	Escherichia coli
580.	In cholera, in untreated cases the mortality may reaches to	70 %
581.	The test used for diagnosis of typhoid fever is	Widal test
582.	Immunization vaccine against cholera gives protection for	6 months
583.	Vaccines used for tubersulosis is	Bacille Calmette Guerin (BCG)
584.	The pneumonia is commonly called	Pneumococcal pneumonia
585.	About 80 strains of streptococcus bacteria causes pneumonia, vaccine is available for	Only 23 strains
586.		

Disease	Cause (Bacteria)
Bacterial leaf spot	Pseudomonad spp.
Bacterial wilt	Ralstonia solanacearum
Bacterial soft rot	Erwinia carotovora
Bacterial galls	Agrobacterium tumefaciens
Bacterial blights	Xanthomonas campestris pv.

587.	Refrigeration at temperature 0° C to 7° C reduce activity of Microbes, this effect is	Bacteriostatic effect

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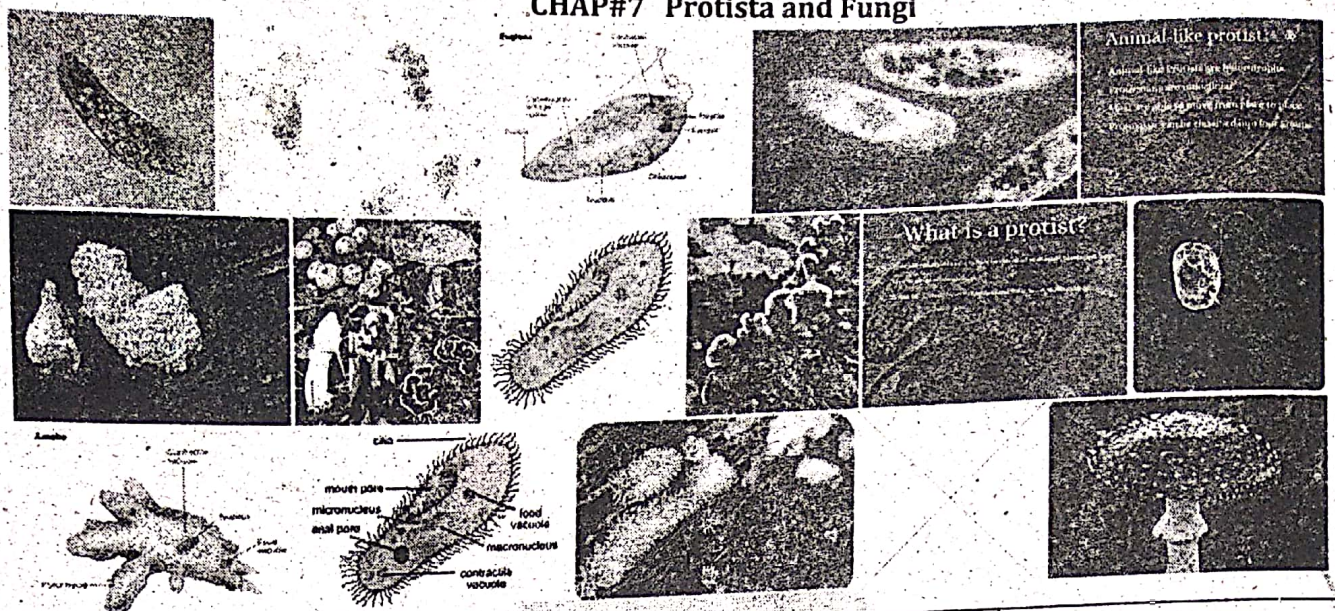
CHAP#7 Protista and Fungi



S.No	Questions	Answers
588.	PROTISTA AND TYPES OF PROTISTS	
589.	The oldest eukaryotes are	Ptotists
590.	Protest kingdom is sometimes called	"Trash can" kingdom
591.	The number of protist species is in between of	60,000 – 200,000
592.	The process of endosymbiosis is present in	Protists
593.	ANIMAL LIKE PROTISTS	
594.	Animal like protissts:	

Protozoa	
Main groups	**Examples & main characteristics**
Zooflagellates or Kinetoplastids	1. Trypanosome which cause African slpeeping disease ETEA-2015 2. Trachonymph in termites digestive track ETEA-2015
Ameoba	1. Pseudopodia motion 2. Reproduce by binary fission
Foraminifera	1. Resembles like snail 2. Secrete shell of calcium carbonate/limestone
Apicomplexes	1. Plasmodium ETEA-2015
Ciliates	1. Two nuclei (micro and mega) 2. Paramecium 3. Balantidum coli which infect intestinal tracts of pigs and rats ETEA-2015

595.	Trachonymph helps in digestion of wood and present in digestive track of	Termites ETEA-2015
596.	The cell extension or motion of amoeba is called	Seudopodia
597.	Dysentery is caused by	Amoeba
598.	Foramininfera helps in determining geological	Age of Strata ETEA-2016

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599.	Sporozoites divide in liver and from	Merozoites ETEA-2005
600.	The carrier of plasmodium is	Female anopheles Mosquito
601.	When RBCs burst and Merozoites are released it this time	Diseases symptoms appear ETEA-2013
602.	Ciliates have outer flexible covering called	Pellicle
603.	Two types of nuclei ,macro(control physiological functions) and micro(need for sexual reproduction) are present in	Ciliates

PLANT LIKE PROTISTS

604.

Type	Characters
Euglenozoids	Autotrophs & heterotrophs, two flagella, pellicle membrane beneath plasma membrane (Euglena)
Dinoflagellates	Cellulose wall, two flagella, red tides, change water colour to red ETEA-2017 , chlorophyll a, c and carotenoids
Diatoms	Two shell made of silica, chlorophyll a, c and carotenoids, diatomaceous earth
Brown algae	Conspicuous seaweeds, ETEA-2015 air bladder, alternation of generation b/w diploid sporophyte and haploid gametophyte, holdfast (Kelps) ETEA-2015
Rhodophyta	Coral reefs, agar and carrageenan production
Chlorophyta	Both uni and multicellular, store food as starch, cellulose wall, chlorophyll a and b, a sexual reproduction is zoospores ETEA-2016 (volvex + chlamydomonas + spirogyra)

605.	Two flagella are attached in Euglenozoids in	Reservoir
606.	Some genera of kelps attain height of	100 m
607.	About 40 genera of Euglenozoids contain	Chlorophyll ETEA-2017
608.	Paramecium reproduce asexually by	Transverse fission
609.	Dinoflagellates contain chlorophyll a. c and	Carotenoids
610.	Dinoflagellates produces	Red tides ETEA-2017
611.	Dinoflagellates have two unequal flagella which are	Perpendicular to each other
612.	Diatoms are made up of two shells made of	Silica

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613.	The floor made by shells of diatoms are called	Diatomaceous earth
614.	Brown algae float during high tides because it possesses	Air bladders **ETEA-2016**
615.	Kelps are brown algae possessing large leaf like	Thallus
616.	Brown algae have large root like structure called	Holdfast
617.	The reddish colour of algae is due to accessory pigment called	Phycoerythrin
618.	The green colour of chlorophyll is due to	Phycoerythrin
619.	Chlorophyta are considered is ancestors of	Plants **ETEA-2014**

FUNGUS LIKE PROTIS S

620. **Fungus like protists:**

1.plasmodial slime molds	**2.oomycota (water molds)**
Plasmodium is mass form in cycle **ETEA-2019**	Parasite or parasites
Back and forth motion of cytoplasm distribute nutrients	Chitin cell wall
Pseudopodia motion	Male organ: antheridia, female: oogonium
Phagocytosis of leaf, bacteria & yeast	Sexual reproduction is oogamous
Meiosis	e.g mycelium

621.	The product of mitotic nuclear division which are not followed by cytokinesis is	Supercell (plasmodium) **ETEA-2015**
622.	When food exhausts the plasmodium growth stops and meiosis occurs in	Flagellate gametes
623.	The flagellate gametes fuse in pairs and form a new	Plasmodium by mitosis
624.	Oomycota are distitnguished from other protists by their	Zoospores
625.	Zoospores have two	unequal flagella
626.	Cell wall of oomycota is made of	Cellulose **ETEA-2014**
627.	Cell wall of fungi is made of	Chitin
628.	Fungi secrete substances into the food which make the food unpalatable,	Poisonous and carcinogenic
629.	On host body, pasrasites water molds produces	White fuzz

KINGDOM FUNGI

630.

Disease	**Cause (fungus like protists)**
Dandruff	*Micosporum furfur*
Aspergillosis	*Aspergillous sp.*
Disease	**Cause (animal like protists)**
Late blight of potatoes	*Phytophthora infestans*
Malaria	*Plasmodium*

631.	Athletet's is	Fungal diseases **ETEA-2015**
632.	Red algae are rich in	Vitamins and minerals

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633.	*Trichophyton* (fungi) cause a diseases called	Ringworms in dogs and horses
634.	The cowpex and smallpox virus is very similar in	Structure **ETEA-2012**
635.	Out of the total world the photosynthesis performed by protists is	One-quarter
636.	The planktons play a major role in photosynthesis in	Aquatic life
637.	The vast majority of planktons in the ocean consists of	Protists
638.	The world largest organism is fungus called	Armillaria ostoyae
639.	A single colony of fungus covers 1000 km² areas, weight 100 tons and about	1000 years old
640.	Chitin is more resistant to decomposition than	Cellulose

CLASSES OF FUNGI AND THEIR DIAGNOSTIC FEATURES

Classes of fungi:

Zygomoycota	Ascomycota	Basidiomycota
All terristial	Sac fungi	Club fungi (club shape basidia) **ETEA-2015**
Coenosytic hyphae	Parasites produces powdery mildow	Primary, secondary & tertiary mycelium
Live on decaying organic materials	40 % forms lichen (symbiotic)	Dikaryotic cell has 2 haploid nuclei **ETEA-2017**
Both sexual and asexual spores	Sexual spores called ascocarps	Bsidiocarp is Tertiary mycelium **ETEA-2015+2016**
Parasites and symbiotic relations	Penicillin drug from pencillium	
Rhizopus stolonifer (common bread mold)	Yeast **ETEA-2010**	Muchrooms, puffballs, shelf fungi, rusts and smuts **ETEA-2014**

641.	Ascus develop	8 ascocarps **ETEA-2014**
642.	Spores formed in each sporangiumare in	Thousands
643.	Asci are produced in ascocarps in	Ascomycota
644.	Ascomycota reproduce asexually by means of conidia, produced in chain at the end of	Conidiophores
645.	Yeast is useful for both bakers and	Brewers
646.	Primary mycelium (haploid nucleus) is also called	Monokaryon (uninucleate)
647.	Fungi evolved from a	Unicellular flagellated ancestors
648.	The ability to switch from heterotrophic to autotrophic is used to treat sewage is	Present in euglena
649.	Cacca means	Cow pus

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650.	Club-shaped basidia are arranged inside a fruit body is called	Basidiocarp
651.	No reproductive structures such as antheridia or archegonia are formed in	Basidiomycota
652.	Cup like ascocarp in fungi is	Apothecium
653.	The cause of dandruff is	Microsporum furfur **ETEA-2010-2013**
654.	The cause of infection in corneal tissue of eye is	Neurospora & Fusarium
655.	Marine alga	Ulva

PATHOGENIC FUNGI

656.

Fungus	Diseases
Rhizopus & mucor species	Lung, brain, gastric tissues infection
Microsporum furfur	Dandruff **ETEA-2013**
Candida sp.	Nail, genital track, Throat and mouth diseases
Neurospora & fusarium	Infection of corneal tissue of eye
Aspergillus sp.	Aspergillosis (symptoms like tuberculosis)
Athletet's foot	Fungal

IMPORTANCE OF FUNGI

657.	In fungi the important adoption for terrestrial mode of life is disappearance of	Flagellated cells
658.	Red tides in ocean are produced by	Dinoflagellate
659.	Plasmodium is found at different stages in man and mosquito. At what stage it can be seen in both hosts	Sporozoite **ETEA-2013**
660.	Aspergillus sp. Is used to produce	Citric acid for coals
661.	The ascocarps of morchella esculanta(a morel) and tuber melanosporum (a truffle) is used for	Their complex flavor
662.	Yeast contain vitamin B and	50% protein
663.	The carrier of genetic information is	DNA
664.	Lichens are known as Pioneers in	Ecological succession
665.	Lichen protect its algae from	Sun's rays
666.	The protective pigment of lichen as used as	Natural dyes
667.	All vascular plants have mutualistic symbiotic association with fungi, this about	80%
668.	Mycorrhiza transfer nutriens(phosphorus, zinc, copper) to plant and get	Organic carbon from it
669.	Fungi recycles nutrients in nature and are called	Recyclers / scavengers
670.	Most common fungal diseases of cereals are rusts and smuts and are caused by	Puccinia & ustilago
671.	World's food harves caused by fungal attach is	50 %
672.	Red rot of sugarcane, late blight of tomato are caused by	Fungi
673.	Ergotamine is obtained from	Claviceps purpurae
674.	Pencillin is obtained from	Pencillium chrysogenum **ETEA-2012**
675.	Cephalosporin is obtained from	Cephalosporium acremonium

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676.	Griseofulvin is obtained from	Pencillium ETEA-2019
677.	Cyclosporine is obtained from	Fungal product
678.	Yeast is obtained from	Saccharomyces cerevisiae
679.	Ergotamine is used as	Facilitate delivery of baby
680.	Pencillin is used as	Pencillium chrysogenum
681.	Cephalosporin is used as	Antibiotic
682.	Griseofulvin is used	Against fungal infection
683.	Cyclosporine is used as	Immunosuppressant drug in organ transplantation
684.	Yeast is used as	Baking and wine making

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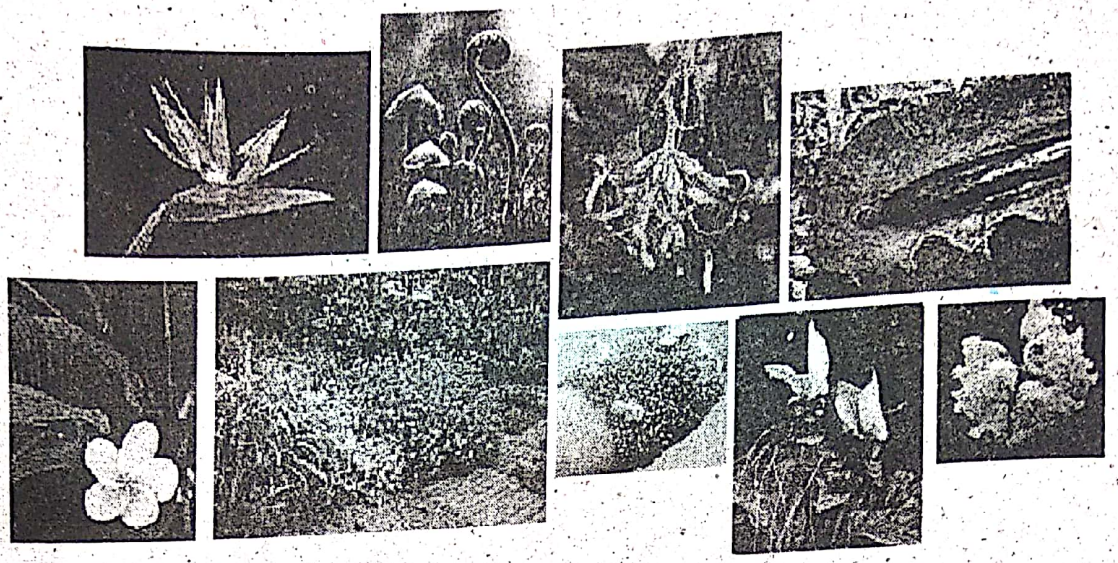
CHAP# 8 Diversity Among Plants



S.No	Questions	Answers
	INTRODUCTION, LYPETIC LINKAGE & ALTERNATION OF GENERATION	
685.	Ferns are dominated in periods of	Permian & Triassic
686.	Ammonoids mollusk are dominated in periods of	Triassic & Jurrasic
687.	Arrangement of species from ancestors to descendants through their eolution is called	Phyetic linkeage
688.	Today Two million species of animals are present and plants present are	0.5 million
689.		

Plants	No of species
Dicotyledons	2,00,000
Monocotyledons	50,000
Gymnosperm	700
Algae	18,000
Fungi	80,000

690.	In plants like algae, mosses and liverworts the gametophyte generation is Larger and sporophyte generation is dependent on	Gametophyte
691.	Both generation are independent in	Ulva & ectocarpous ETEA-2016 ETEA-2019
692.	Vascular tissues are present only in sporophyte and absent in	Gametophyte
	NON VASCULAR PLANTS	
693.	Classes of bryophytes	

S.No	types	Also called	Example	
1	Musci	Mosses	Funaria &polytrichum	Rootles, leafless,stemless ETEA-2016
2	Hepaticeae	Liverwort	Marchantia	● Green branched thallus
3	Anthocerota	Hornworts	Anthoceros	●Lack true roots,stem and

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	e	ETEA-2019		leaves ●Rhizoids are present

694.	Fusion of sperm with egg or oospere to form zygote or oospore is called	Fertilization
695.	Bryophytes are also called	Embryophytes
696.	Moss(2.7 cm height) is	Gregarious in habit
697.	Antheridia and archegonia of mosses are sometime mixes with each other by hair like structures known as	Paraphyses
698.	If antheridia and archegonia are present on same or two branch of same plant	Monoecious
699.	If antheridia and archegonia are present on branch separate plants	Dioecious
700.	The antheridium is multicellular, short stalked, club shaped body which contain	Antherozoid cells
701.	The lower swollen portion of archegonium is called	Venter (belly)

TRACHOPHYTA

702.

S. No	Sub-divisions	Living	Fossil
1	Psilopside	Psilotum & Tmesipetris	Psilophyton(psilopsidom), Rhynia, Cooksonia
2	Lycopsida	Lycopodium, Selaginella, Iseotes, Phylloglosum ETEA-2019	Lepidodendron & sigillaria
3	Sphenopsida	Equisetum (only living genus) ETEA-2010	Clamites (extinct)
4	Pteropsida	It contain ferns, angiosperm and gymnosperms: ETEA-2014	

703.	Except from ovum other cell in archegonium are	Functionless

704.

Plants types	Examples	
Filicineae /ferns	Adiantum, Pteris, Dryopteris, & Pteridium ETEA-2010	
	Living	Fossils
Gymnosperm	Cycads & conifers	---
Angiosperm	------	----

705.	Waxy waterproof layer called cuticle is present in	Bryophytes
706.	Heterogamy of Bryophytes are	It's adaptation of life ETEA-2010
707.	The moss.which is used as packing material is	Sphagnum
708.	Sphagnum is also called	Peat moss ETEA-2017
709.	Tracheophytes are also called vascular plants due to presence of	Vascular tissues

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710.	Tracheophytes are also called Tracheophytes due to presence of cells called	Tracheids
711.	Tracheids are water conducting cells of	Xylem
712.	In tracheaphytes the sporophyte generation is dominant and the gametophyte is	Small reduced & short lived
713.	Rhynia, psilotum, club mosses, horsetails and ferns	Lower vascular plants
714.	Gymnosperm & angiosperms are	Higher vascular plants
715.	Spore consists of cytoplasm and nucleus, surrounded by	Double layer of cell wall
716.	The inner cell wall of spore is called	Intine or endosporium
717.	The outer cell wall of spore is called	Exine or exosporium
718.	Intine is made of	Cellulose
719.	Exine is made of	Chitin
720.	**Four sub-division of tracheophyta:**	

S.No	Sub-divisions	Root	Leaf	Stem
1	Psilopside	Rootless	Leafless	Dichotomous
2	Lycopsida	Root	Microphyllous leaf	Dichotomous
3	Sphenopsida	Adventitious roots	Microphyllous leaf	Rib/joint stem
4	Pteropsida		Megaphyllous	

721.	The stem and petiole of adiantum are covered with numerous brownish scales called	Rementa
722.		

Pteropsida basic properties		
a	Filicineae	Roots from rhizome, Megaphyllous leaf
b	Gymnosperm	Seeds ,No fruit , Open carpels , cones ,dimorphic leaves
c	Angiosperm	Seed, flower, fruit

723.	The roots of adiantum are	Fibrous adventitious
724.	Ferns have prostate plant body that bears numerous sporangia on the leaves called	Fronds
725.	Microphyllous leaf are present in	Club mosses and horse tails
726.	Primitive vascular plants lacked	Leaves
727.	In filicineae sporangia are grouped under the leaves on margin of pinnules called	Sori
728.	Filicineae have a	Subterranean rhizome
729.	Filicineae are found in	Moist & shady places
730.	The immature and young filicineae are	Coiled and short
731.	In lower vascular plants seeds are not produced they reproduce by	Spores
732.	Higher vascular plants are	Seed producing
733.	The leaves of lycopsida are small and simple and are called	Microphyllus
734.	In lycopside, sporophyll usually forms	Strobili
735.	In lycopside,small outgrowth present at the base is called	Ligule
736.	In some lycopsida such as lycopodium, the ligule is	Absent
737.	Sphenopsida are also called	Arthrophytes

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738.	Sphenopsida are commonly called	Horse tail ETEA-2019
739.	Lycopsida are commonly called	Club Mosses
740.	Number of species of selaginella are	300
741.	Selaginella have four rows of leaves, two small on upper surface and two large on	Two sides
742.	In selaginella, a long slender root like organ give off from stem which is known is	Rhizopore
743.	Selaginella plant is	Sporophyte
744.	Sporangia are closely packed to form	Terminal cone or strobilus
745.	Special lateral appendages called sporangiophores are developed which bear	Sporangia
746.	The mature gametophyte of sphenopsida or horse tail is called	Prothallus
747.	Spore germinate in week time and produce haploid gametophyte called	Prothallus
748.	Prothallus is independent plant because it produce its own food with the help of	Chloroplast
749.	Sporophyte give rise to gametophyte and gametophyte give rise to sporophyte is	Alternation of generation
750.	Ripened and fertilized ovule is called	Seed ETEA-2016
751.	Around the sporangium, in evolution branch like outgrowths fuse and form	Integuments
752.	The integumented megasporangium in which megaspore is retained is called	Ovule or unripe seed
753.	All gymnosperm are invariably branched except	Cycads
754.	The leaves of gymnosperm are evergreen and dimorphic i.e.	foliage & scale leaves
755.	In gymnosperm secondary growth or increase in thickness occur by activity of	Cambium
756.	1/4th of oospore is concerned with development of embryo so fertilization is	Single
757.	Seed of angiosperm are enclosed in the	Fruits

ANGIOSPERMS

758. Sub classes of angiosperm:

	Monocotyledonous	Dicotyledonous
No of cotyledons	1	2
Plamule is	Lateral	Terminal
Cotyledons are	Terminal	Lateral
Root	Adventitious	Tap root
Rule venation	Reticulate	Parallel
Flower symmetry	Trimerous	Pentamerous
Vascular bundles are	Closed Scattered Oval shape	Open In ring form Wedge shape
Xylem bundle	5 – 8	2 – 6

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	Secondary growth	Absent Cambium absent	Present Cambium present

759.	The wall of microspore become thick and is known as	Pollen grain
760.	The pollen grain send tube called pollen tube which contain two	Male gametes & tube nucleus
761.	The ovary contain ovule, the ovule consist of tissues called	Nucellus cover by integument
762.	The fusion of sperm with egg to form zygote and other sperm with endosperm to form fusion nucleus is called	Double fertilization **ETEA-2017**
763.	The fusion nucleus develops into nutritive tissues called	Endosperm
764.	The integuments of the ovule form the seed coats called	Testa and tegment
765.	After fertilization, ovule matures into	Seed
766.	The walls of the ovary develops into	Fruit or ripening
767.	The size of angiosoperm ranges from	1 mm - 100m
768.	Size of wolfia is	1 mm
769.	Size of Eucalyptus is	100 m
770.	Single flower on pedicle	Solitary flowers
771.	Clusters of flowers on floral axis	Inflorescence
772.	The Inflorescence may be	Racemose or Cymose
773.	Main axis continue to grow, oldest flowers at the base are	Racemose
774.	Main axis ends with flower, oldest flowers at the top	Cymose
775.	The leaves of English yew(*Taxus bacata*) is used in synthesize of compound called	Taxols
776.	A bark of fever tree(*Cinchona succiruba*) produces quinine which is used to treat	Malaria
777.	**Spermatophytes means Seed plants. It includes** 1. 300 families 2. 12,500 genera 3. 3,00,000 species	
778.	The most important of angiosperm belongs to Gramineae of the	Grass family
779.	The number of species of grass family are	7500 species
780.	Three billion years old bacteria was discovered by	Barghoon & Schopt
781.	Example of C4 plants are	Sugar cane and maize
782.	Ferns are dominated on earth during period of	Permian and Triassic
783.	All the flowers come to same level due to equal size of their pedicle in	Umbel **ETEA-2009**
784.	Crop rotation leads to	Soil fertility
785.	In red ,green ,blue and sunlight, the least important for photosynthesis is	Green light
786.	In bryophytes, sterile hairs are produced between sex organs to keep them	Wet
787.	The amount of energy in food is measured by	Calories
788.	Club-mosses are also called	Lycopsida
789.	Horse tails are also called	Sphenopsida
790.	The process of cell division results in	Two daughter cells
791.	Hydra reproduce asexually by	Budding

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792.	Class fillicineae, Gymnosperm, and angiosperm belongs to sub-phylum pteropsida and to class	Trachopyta

INFLORESCENCE

Inflorescence	Examples
Typical	Amaltas (cassia fistula)
Spike	Puth kanda (Achyranthus) And Bottle brush
Catkin	Mulberry & Willow
Corymb	Candytuft (Iberis)
Umbel	Brahmi booti
Umbel of umbel	Carrot ETEA-2018
Panicle	Grapes, Mango and Oat ETEA-2014
Capitulum	Sunflower
Uniparous (Monochasial)	Begonia, Tradescantia
Biparous (Dichasial)	Silene & Ipomoea
Multiparous	Euphorbia

793.		
794.	Pollen sacs are	Microsporangium ETEA-2009
795.	A pollen grain germinates and develops into	Micro-gametophyte ETEA-2010
796.	Food is renewable sources due to	Continuous photosyntheises
797.	Alternation of generation in plant is regarded a mechanism for	Promoting survival
798.	Spongilla is	Fresh water sponge

BENEFITS OF ANGIOSPERMS FOR HUMANS

799.	For sleeping disorder, autoimmune diseases and glaucoma, we use	Cannabis (Cannabis sativa)
800.	For altitude sickness in south africem, we use	Coca (Erythroxylon coca)
801.	To treat Alzeheimer's disease, we use	Daffodil (Narcissus spp.)
802.	We use taxol for breast cancer and this is obtained from	English yew (taxus baccata)
803.	Quinine is used for malaria and this is obtained from	Fever tress (Cinchona succiruba)

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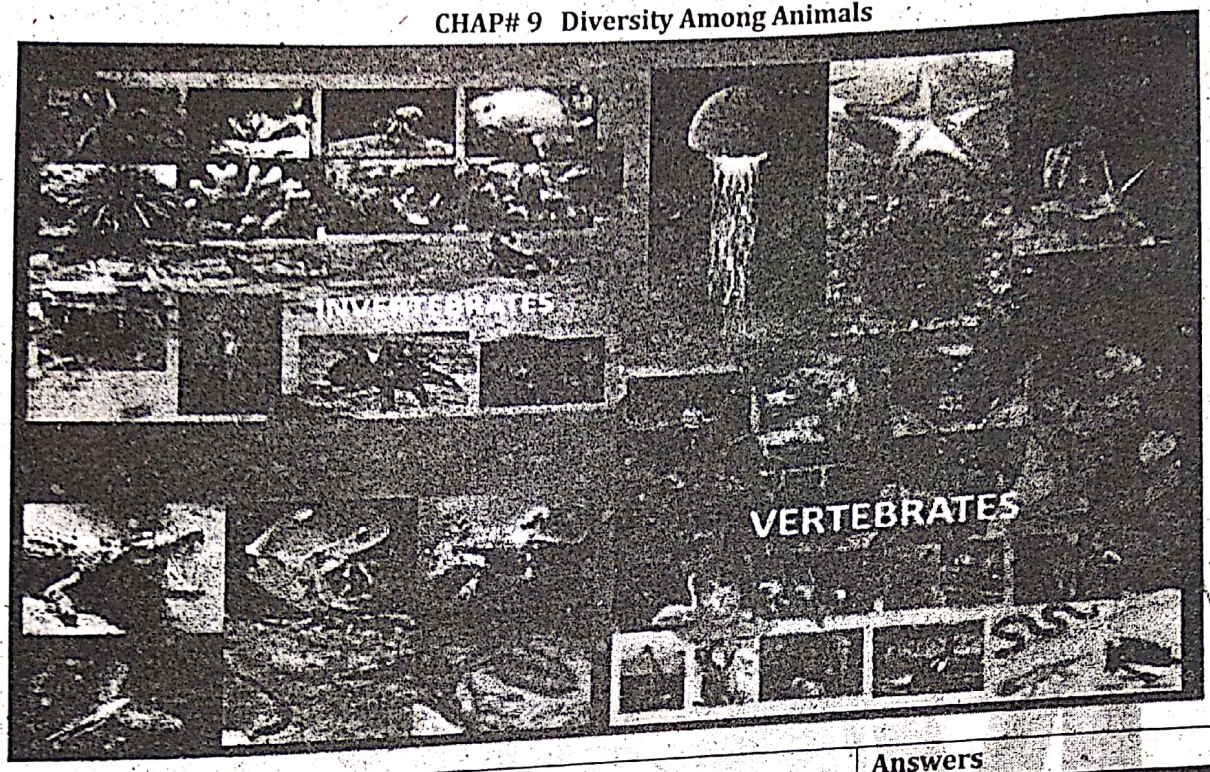
CHAP# 9 Diversity Among Animals



S.No	Questions	Answers
	INTODUCTION, CLASSIFICATION OF ANIMALS, COMPLEXITY IN ANIMALS	
804.	The world Animalia is derived from Latin world which means	Soul or breath
805.	Number of species of animals are	15,00,000
806.	The outer most covering of animal is	Cell membrane
807.	Animals evolved from single cell organism included in kingdom	Protoctista
808.	**On basis of cell composition animals are divided into three categories:**	

S.No	Type	Cell & tissues
1	Protozoa	Single celled organism
2	Parazoa	Simple multicellular having no tissues and organ
3	Metazoa	Multicellular organisms having tissues and organs

809.	The gel like non-celiular material present in diploblastic are called	Mesogloea
810.	The central cavity of diploblastic are called Coelenteron or	Gastro-vascular cavity
811.	There is transport and nervous system in	Diploblastic
812.	Diploblastic have no anus and their digestive system is also called	Sac like digestive system
813.	In triploblastic, layers appear through embryonic life and in adult they are	represented by the organs
814.	**Three layers of triploblastic:**	

S.No	Layer	Organ formed from layer
1	Ectoderm	Skin & nervous system
2	Endoderm	Digestive system & associated glands
3	Mesoderm	Skeletal, excretory, reproductive and all other body organs and

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	systems
815.	Acoelomates are those animals which do not contain — Coelom or body cavity
816.	Instead of parietal and visceral layer, in Acoelomates the mesoderm forms loose tissues called — Mesenchyma or parenchyma
817.	In Pseudocoelomates the cavity is — Not a true body cavity
818.	The Pseudocoelomatess the cavity develops from blastocoel not from — Archenteron

Parazoa	ETEA-2016				
Metazoa or Eumetazoa	Diploblastic	Radiata			Phylum Porifera
					Phylum coelenterates
	Triploblastic	Bilateria	Acoelomates		Phylum Platyhelminthes ETEA-2019
			Pseudocoelomates		Phylum Aschelminthes
			Coelomates	Protostomes (first mouth)	Phylum Molluska
					Phylum Annelids
					Phylum Arthropoda
				Deuterostomes (anus first)	Phylum Echinodermata
					Phylum Chodata

819.	Animals of Phylum Echinodermata are are bilatrial symmetrical in their larval stage and adults gain	Radial symmetry
820.	Coelomic epithelium is absent in	Pseudocoelomates
821.	pseudosoelom has no relation with Reproductive system and	Excretory system
822.	Coelomates are those animals in which true body cavity or coelom is	Present
823.	Daughter cell lie on the top of previous cell	Radial cleavage
824.	If embryonic cells are separated, each one will develop into a complete organism	fate of cell is indeterminate
825.	Radial cleavage and fate of cell is indeterminate are properties of	Deutrosomes
826.	Phylum ctenopora is also called "minor pyla" which contain Ignored animals or	less in numbers
827.	The categories of Phylum can be sub divided by using prefix sub or super except for	Genus
828.	The smallest and basic unit of classification is	Species
829.	System of naming of animal is called	Binomial nomenclature

PHYLUM PORIFERA

830.	The pores of phylum porifera are called	Ostia
831.	Body of porifera is tubular and open anteriorly end called	Osculum
832.	Walls of porifera are made of two layers, the outer Pinacoderm and the inner	Choanoderm
833.	Pinacoderm is made of flattened cells called	Pinacocytes
834.	Choanoderm is made of flagellated collar cells called	Choanocytes
835.	Porifera contain some special mobile cells called amoebocytes which produce	Ova & sperm

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836.	The poriferas dependence of dead decaying organic matter is	80%
837.	All sponges have skeleton except class	Mycospongida
838.	Sponging is a form of protein in the form of	Fibers
839.	Sponges are found in warm water of	Mediterranean sea
840.	Sponges are used to absorbs	Sound waves
841.	**Examples of sponges are:**	

Sycon	Marine sponge	
Spongilla	Fresh water sponge	ETEA-2008
leucolsenia	Tubular marine sponge	ETEA-2010
Wuplectella or venus flower basket	Siliceous sponge	ETEA-2018

842.	Predatory sponges are found 5000 m beneath the sea and belongs to	Family Cladorhizidae

PHYLUM COELENTERATEA (CNIDARIA)

843.	Word coelenterate is derived from Greek: Kolios means hollow & enteron means	Intestine
844.	Coelenterates are also called cnidarian due presence of cnidocytes cells which	Rise to nematocyst
845.	Majority of Coelenterates are marine but some also live in	Fresh water as well
846.	The cells of endoderm in Coelenterates are specialized for	Digestion
847.	In coelenterates mouth are surrounded by tentacles which bear organ of effence and defence called	Nematocyst ETEA-2010
848.	In coelenterates the enzymes are produced from	Glandular cells of endoderm
849.	In coelenterates special feeding zooids which are called	Gastrozoids
850.	The function of gastrozoids are to nutrition to	Whole colony
851.	Gastrozoids are found in obelia & animals of order	Siphonophora
852.	Coelenterates are	Carnivorous
853.	In coelenterates the digestion are both	Intra and extracellular ETEA-2010
854.	Portuguese man of war are commonly known as	*Physalia pelagica* ETEA-2016
855.	The speed of *Physalia pelagica* is	12.1 cm/sec
856.	The fast moving coelenterate is	Jelly fish (just-propulsion method)
857.	The very common characteristics of coelenterates are the presence of Polymorphism and alternation of generation or	Metagenesis ETEA-2012
858.	Two major types of zooids are	Polyps(tube) & Medusa(umbrella) ETEA-2012
859.	In obelia, the polyph form, called blastostyle reproduce into a seuser shape	Medusae
860.	**Coral reefs are of four types:**	

S.No	Types	
1	Fringing reef or shore reef	Simplest
2	Platform reef or table reef	Without a lagoon
3	Barrier reef	No connection with land

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	4 Great Barri cer reef	
861.	A strip of sea water is always present between barrier reef and and main land called	Lagoon
862.	The lagoon may be	180 feet to 3 miles wide
863.	The length of the great Barri cer reef of Australia is	1250 miles (2012 km)
	PHYLLUM PLATYHELMINTHES	
864.	Word Platyhelminthes was coined by Gaugenbaur (1859) which means	Flat worms
865.	The bodies of Platyhelminthes are unsegmented or Superficially segmented &	True segmentation is absent
866.	In Platyhelminthes cilia are present in free form while cuticle is present in	Parasitic form
867.	In Platyhelminthes, organs of attachment are present in the form of	Hooks and suckers
868.	In earth worm, mucin and energy are produced by	Pharyngeal mass
869.	Two chamber heart are present in	Fish ETEA-2008
870.	The term "bivalent" means	2 chromosomes
871.	Kangaroo is	Homeothermic
872.	Polymerization is a process of producing high molecular weight compound	From Monomers
873.	In Platyhelminthes, in free from D.S is well developed while it is poorly developed in Class Trematoda and absent in	Class Cestoda ETEA-2010
874.	Thin elastic wall with nucleus and cavity containing cilia flickering through flame	Flame cell ETEA-2016
875.	In Platyhelminthes flame attached with duct which open with	Excretory pore
876.	In Platyhelminthes, the nervous system consist of pair of anterior cerebral ganglion and ventral ganglion connected by	Nerve ring and 1/3 nerve cords
877.	Platyhelminthes are	Hermaphrodite ETEA-2011
878.	Muscular system is well developed in free form of	Platyhelminthes
879.	In Platyhelminthes, reproductive system is well developed with gonads, ducts	And copulatory organs
880.	Egg are small with yolk and are produced in large numbers in	Platyhelminthes
881.	Fertilization is always internal in	Platyhelminthes
882.	In Platyhelminthes, the fertilized egg grow into new individual as in	Planaria and tape worm
883.	In Platyhelminthes different type of larvae are formed in	Liver fluke
884.	In Platyhelminthes regeneration ability is present in class	Tubellaria (planaria)
885.	In Platyhelminthes regeneration ability is absent in class	& Cestoda (tape worms)

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	Trematoda(liver flukes)	
886.	All the members of Platyhelminthes are	Solitary
887.	Trematoda(liver flukes) & Cestoda (tape worms) are parasite so regeneration	Ability is absent
888.	The total number of species of Platyhelminthes are	15,000
889.	The length of planaria is	10 mm
890.	The length of tape worm is	16 feet or 5 meter
891.	The tape worm found in human is	Taenia saginata
	PHYLUM ASCHELMINTHES (NEMATODA)	
892.	According to Hegner and Engemann, phylum Aschelminthes consist of Five Classes Gastrotricha, rotifera, kinorhyncha, nematode and	Nematomorpha
893.	The spiny, marine and microscopic organisms are called	Kinorhyncha
894.	The word nematode is of Greek origin which means	Thread
895.	The body of nematodes are Non segmented and	Tapering at both ends
896.	The fluid contained in the body of the nematodes work as	Blood
897.	Excretory consists of two longitudinal canals on each side which opens on ventral side behind the mouth is about	Nematodes
898.	The nervous system consist of nerve ring which encircles the pharynx and send its branches to body parts	Nematodes nervous system
899.	In nematodes muscles are arranged in four longitudinal bands while circular muscle are	Absent
900.	male is smaller than female of	Ascaris
901.	Power of regeneration is absent in	Nematodes
902.	Most nematodes are white or cream but ascaris is reddish tinge because of	Dissolved haemoglobin
903.	In male of nematode the testes is long, coiled thread with seminal vesicle and open in rectum by short	Ejaculatory duct
904.	In female nematodes the two uteri unite posteriorly forming vagina which on ventral surface at the female genital aperture situated in the	Middle line
905.	The most common animal of phylum nematode is	*Ascaris lumbricoides*
906.	The length of female *Ascaris lumbricoides* is	8 – 16 inches
907.	The length of male *Ascaris lumbricoides* is	6 – 12 inches
908.	The past of male ascaris is curved with two spine like structures called	Penial setea
909.	Female ascaris may contain 27 million eggs at one time at lay about	2 lac eggs per day
910.	*Enterobius vermicularis* is human parasite commonly known as	Pinworm
911.	The parts of body where *Enterobius vermicularis* lives are	cecum, colon & appendix
	PHYLUM MOLLUSKA	
912.	The word mulluscus is been derived from Latin word "molluscus" means	Soft
913.	The largest phylum of invertebrates is	Arthropoda ETEA 2009
914.	The second largest phylum of invetebrates are Phylum mollusks	Phylum mollusks

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915.	The number of species of phylum mollusks are	80,000 and fossils are 35,000
916.	Most mollusks are protected by shell of calcium carbonate secreted by	Mantle
917.	In some mollusks the shell may be internal, external are	Completely absent
918.	The body of mollusks can differentiated into head, dorsal visceral hump and	Ventral muscular foot
919.	The space between the body in mollusks are called Mantle cavity in which	Kidney and anus opens
920.	Mollusks respire through gills present in the	Mantle cavity
921.	Mollusks have respiring tongue called	Radula
922.	The blood mollusks are colourless and contain WBCs and have no	Respiratory pigments
923.	Nervous system consist of three pairs of orange colour ganglia connected by	Nerve cords in mollusks
924.	The testes are white and ovaries are reddish and fertilization is external in	Mollusks
	PHYLUM ANNELIDA	
925.	The word annelida is of Greek origin annelus means	Little ring
926.	The animals of phylum annelids are called annelids because they have	Metamerically Segmented body
927.	Annelids have	Closed circular system
928.	The colour of annelids blood is red due to	Haemoglobin dissolve in plasma
929.	Excretory system of annelids consist of metamerically arranged	Nephridia
930.	Nephridium opens to the exterior through	Nephridiopore
931.	Locomotary organs are setae in earthworm and parpodia in	Neries(gills under parapodia)
932.	The body of annelids and arthropods are covered with	Cuticle
933.	Mostly annelids are	Hermaphrodite ETEA-2015
934.	Locomotory organs in earthworm	Satae
935.	Locomotory organs in Neries	parapodia
	PHYLUM ARTHROPODA	
936.	The word arthropoda are derived from two Greek words, Arthros means jointed and Podos means	Limbs or legs
937.	Body of arthropoda are differentiated into head, thorax and	Abdomen
938.	The blood of arthropos are haemolymph because it does not contain oxygen	And carries food only
939.	Respiration in arthropods in aquatic life takes place through gills and in	Terrestrial through trachea
940.	Trachea communicate with exterior in arthropods by	Spiracles
941.	Arachinids(scorpion & spider) are group of arthropods which have	Book lungs ETEA-2014
942.	In arthropods the excretion occur either malpighian tubule in insects and	Green/coxal gland in crustacean ETEA-2015
943.	Sexual dimorphism is generally present in	Arthropodes
944.	A pair of cerebral ganglia(brain) connected to a double nerve	Arthropods

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	cord in	
945.	All the changes occurring from the fertilization of an egg to the formation of an adult are collectively called Metamorphosis which occur in	Arthropods
946.	During metamorphosis a larva undergoes a series of changes called	Ecdysis or moultuing
947.	The stage between ecdysis are called	Stadia ETEA-2014
948.	The stadia attained by insect larva in any stadium between two ecdysis is	Termed as instar
949.	The final instar is the	Adult or imago
950.	On the basis of metamorphosis the arthropods are divided into three groups	

S.No	Types	Metamorphosis	Examples
1	Ametabola	No metamorphosis	Collembolan & other wingless insects
2	Hemimetabola	Incomplete metamorphosis	Cockroaches & wasps and other insects
3	Holometabola	complete metamorphosis.	Flies, butterflies, moths, beetles e.t.c

951.	The connecting link between annelids and arthropods are	Onychophora
952.	Onychophora, a group of arthropods consist of	70 species classifies in 10 genera

PHYLUM ECHINODERMATA

953.	The name of Phylum echindermata are derived from two Greek words : echinos means spine and	Derm means skin
954.	Echinoderms are	Exclusively marine
955.	Echinoderms are bilaterally symmetrical in larval stage and radial symmetrical	As adults ETEA-2014
956.	In echinoderm the water vascular system including tube feet are used for	Locomotion
957.	A typical circulatory system present in echinodrerms also called	Heamal system
958.	Digestive system of echinoderms consist of 10 pairs of pyloric caecae, the	Digestive glands
959.	All the echinoderms including the starfish are	Carnivores
960.	In echinoderms fertilization is external but some are	Viviparous
961.	In echinoderms respiration occurs through a variety of structures e.g	

Echinoderms	Structures
Starfish	Papule ETEA-2008
Sea urchins	Peristomical gills
Sea urchins	Cloacal respiratory tract
Brittle star	Genital bursae

962.	In echinoderms amoebocytes absorb wastes and remove them by	Rectal caecae
963.	In echinoderms, Nervous system consist of radial ganglia	Are poorly developed

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	containing nerve cords & sense organs	
964.	In echinoderms, the radial nerve cords ends in a pigmented mass known as	Eye
965.	A single arm with a part of central disc regenerate into a	New animal
966.	Echinoderms have no parasitic member and all are marine, bilaterally symmetrical in larval stage and radial symmetrical in adult stage which seem as	Secondary phylogenetic origin
967.	Brittle star is brittle because it can break off its	Arm when injured
968.	Energy for muscular activity in echinoderms and chordates are available by	Creatinine phosphate
969.	Pattern of cleavage of fertelization egg, formation of mesoderm, anus, mouth and coelom are similar in	Echinochordates and hemichordates
	PHYLUM HEMICHORDATA	
970.	Echinoderms and chordates are evolved from	Common ancestors
971.	Hemichordates are worm like animals which are found in	Shallow ocean bottom
972.	Hemichordates are closely related to chordates but similarities with	Echinoderms
973.	Hemichordates body are divided into three regions, anterior protosome, middle mesosome and Posterior metastome or	Proboscis, collar & trunk
974.	Body wall of hemichordate are made of unicellular epidermis and	Mucus secreting cells
975.	Digestive system is complete and consist of long straight tube in	Hemichordates
976.	Circulatory system is composed of dorsal and ventral vessel	Hemichordates
977.	Gills slit are present behind the collar which perform function of respiration, in	Hemichordates
978.	A single glomerulus connected to blood vessels constitutes excretory system of	Hemichordates
979.	Brain occur in middle mesosome and main nerve tracts are present in	Mid dorsal and mid ventral line
980.	Tornaria larva resembles to	Bipinnaria larva
	PHYLUM CHORDATA	
981.	The word chordate are derived from Notochord where chord means	Thread or rope

982. **Basic characteristics or chordate characteristics are as follow:**

1. A dorsal stiff rod is found in all chordates called Notochord.
2. In higher chordates notochord are replaced by Vertebral column.
3. All chordates have central, dorsal, hollow nervous systems which lies above the notochord.
4. All chordates develop gills slits which sometimes called Perforated Pharynx at least in the embryonic stage.
5. Perforated pharynx are functional in fishes and amphibions.

983. **Phylum chordate are classified into two divisions and three sub phylums:**

Divisions	Sub phylum	Groups	Classes
Protochordata or Acrania	Urochordate	----------	
	Cephalochordate	----------	
Craniata	Vertebrata	Pisces (fishes)	Cyclostomata/ Agnatha
			Condrichthyes/53artilaginous

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				fishes
				Osteichthyes / bony fishes
			Amphibia	
			Reptilian	
			Aves (Birds)	
			Mammalia	

984.	In Protochordata or Acrania, skull is	Absent
985.	In Craniata, skull is	Present
986.	Notochord is present in free swimming larvae and absent in adults in	Urochordata
987.	Subphylum Urochordata are also called tunicate because they contains shealth called tunic which is made of	Tunicin (related to cellulose)
988.	The body of Cephalochordate are in form of long rod hence called	Sea lancelet
989.	Hollow cord runs through out the body in	Cephalochordate
990.	Hooves, Hemoglobin and enzymes are	Proteinous
991.	Cephalochordate are Filter feeders and it's example is	Branchiostoma(amphioxus)
	SUB PHYLUM VERTEBRATA	
992.	Vertebrates are divided into Five groups /super classes (Pisces, Amphibia, Reptilia, Aves or Birds, Mammalia)	PARAM (formula)
	CLASS PISCES	
993.	The largest group of vertebrates are fishes , which constitution is	48%
994.	The number of living fishes are more than	29,000

995.

	Cyclostomata	Chondrichthyes	Osteichthyes
Skeleton	Fibrous cartilage	Cartilage	bones
Body	Long eel like	Streamlined	
Scales	Lacked paired fins/appendages	covered with placoid scales	Body covered with scales ETEA-2015
Mouth	circular	Ventral	Jaw with teeths
Skin	naked without scales	covered with placoid scales	
Gills by operculum are	Not Covered	Not Covered	Covered ETEA-2013
Swim bladder	Absent	Absent	Present
	Parasitic	Carnivores	
	Marine	Aquatic	

Class cyclostomata or Agnatha:

996. Jawless fishes having circular mouth
997. Long eel like body
998. Skin is naked without scales .
999. Lacked paired fins or appendages

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1000. Seven pair of gills are found which opens to outside separately
1001. Gills not covered with operculum

Class chondrichthyes ;

1002. Skeleton is of lower grade means of fibrous cartilage
1003. They are parasitic and have no stomach
1004. Mouth is adopted for sucking
1005. e.g: Petromyzon merinus (lamprey) and Maxile glutenosa (hag fish)
1006. Skeleton made of cartilage
1007. Streamlined bodies
1008. All live in marine environment
1009. Mouth is ventral
1010. Body is covered with placoid scales which are small and numerous and give the skin a touch of sand paper
1011. Circulatory system is with many pairs of aortic arches
1012. Heterocercal tails in which dorsal lobe is longer than ventral lobe
1013. Respiration takes place through 5-7 pairs of gills
1014. Gills are not covered with operculum and open separately
1015. Most are carnivorous
1016. Swim bladder is absent
1017. Sexes are separate and most of them are viviparous
1018. E.g: sharks, rays, skates and chimaeras

Class osteichthyes;

1019. Skeleton made of bones
1020. Inhibits all types of aquatic habitats
1021. Body covered with scales such as (**1.**Median fins: dorsal fin, anal fin, caudal fin. **2. Paired fins:** pectoral and pelvic fins)
1022. Swim bladder is found which are hydrostatic in function and provide buoyancy
1023. Respire through gills which are covered with operculum
1024. Jaws may be with or without teeth
1025. Brain is developed with ten pair of cranial nerves
1026. Blood contain haemoglobin and its colour is red
1027. Sexes are separate but some are external

1028.	1. Majority of bony fishes are oviparous but some are ovoviviparous and viviparous	
1029.	Fishes of subclass Dipnoi are called Lung fishes which are only	3 live in this world
1030.	Dipnoi fishes when aestivate in holes they respire through extremely	Vascularized swim bladder
1031.	In rainy season dipnoi came out of holes and respire through	Gills
	CLASS AMMPHIBIA	
1032.	The word amphibian is derived from latin word Amphi which means	Both
1033.	Amphibian are considered on border line of both	Aquatic & terrestrial
1034.	Transition from aquatic life to terrestrial is clearly indicated by	Amphibian
1035.	Certain fin fishes of dipnoi came to live in shallow water in period of	Devonian
1036.	Amphibia are poikilothermic and fertilization is	External

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1037.	Tadpole larva respire through gills and swim with the help of	Laterally flattened tail
1038.	After developing gills during metamorphosis, amphibian came out	Of water
1039.	In some amphibian, gills are retained through out the life such as in	Necturus
1040.	Amphibians have tetrapods having two pectoral two pelvic limbs, some are legless like	Caecilians
1041.	Amphibian feet are webbed and without	Claws
1042.	The skin of amphibian are pigmented, smooth and	glandular
1043.	The mixing of oxygenated and deoxygenated takes place in one ventricle in	Amphibian ETEA-2014
1044.	In hibernation, amphibian get energy out from fat bodies deposited around the	Kidneys
	CLASS REPTILIA	
1045.	The true land vertebrates are	Reptiles
1046.	The bodies of reptiles can be divided into four region, Head, neck, trunk	and tail

Reptiles are

1047. Pentadactile means having five fingers
1048. Lowest amniotes having embryo covered with amnion
1049. Have protective membranes such as yolk sac,, amnion, chorion & allontoise
1050. They are oviparous and lay shelled eggs
1051. Their skin is thick and acaly and dvoid of glands
1052. Exoskeleton is in the form of nails and epidermal cells and digits are with claws
1053. Teeth are present in jaws except turtle and tortoise
1054. Colour of blood is red due to presence of haemoglobin
1055. Respiration takes place through lungs which have spongy tissues
1056. Gills never develop in reptile
1057. Excretory organs are metanephric kidneys
1058. Uricotelic means excrete uric acid
1059. Dominant in age of reptiles
1060. Flourished in Mesozoic period(225-65 million years back) ETEA-2016
1061. Modern reptiles are the descendents of Dinosaurs of Jurassic period (195-136 million years back) and Cretaceous period(136-65 million years back.

Class Aves

Birds like characteristic of archaeopteryx:

1062. Well developed contour and feathers
1063. Forlimbs modified into flying wings
1064. Tail with two rows of feathers
1065. Large skull with single occipital condyle
1066. Jaw elongated to form beak

Reptilian characteristics of archaeopteryx:

1067. Presence of scale on legs
1068. Solid bones without air spaces
1069. Long tail consist of 20 caudal vertebrae
1070. 9-10 cervical vertebrae
1071. No fusion of trunk and sacral vertebrae

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1072. Sternum not keeled free cervical and abdominal ribs are also present
1073. Simple brain with cylindrical hemisphere and unexpended cerebellum
1074. Fore limb with three clot fingers

1075.	Archaeopteryx, the lizard tailed bird are found in rocks of Jurassic period in	1861
1076.	Archaeopteryx have both the characteristics of	Reptiles & birds ETEA-2010
1077.	both bird and mammal are evolved from	reptilian ancestors
1078.	The connecting link between reptiles and birds are	Archaeopteryx

Characteristics of Birds:

1079. Fore limb with three clot fingers
1080. Homoeothermic means cold blooded
1081. Body covered with epidermal exoskeleton
1082. Body is fusiform(streamlines)
1083. Forelimbs are modified to wings
1084. The aquatic bird posses webbed feet
1085. Skin without gland except uropygial gland at the base of tail
1086. Hollow bones
1087. Sternum is keel
1088. Jaw without teeth and form beak
1089. Digestive system has a crop to store and the gizzard to grind it
1090. Blood is red due to haemoglobin contained in oval, nucleated RBCs
1091. Vocal cords are not present in larynx but special sound box is present in junction of trachea and bronchi
1092. Lungs are provided with extra air sacs which extends to viscera
1093. Eyes are provided with third eyelid, the nictitating membrane
1094. A rudimentary pinna is present outside the external auditory opening
1095. Excretory organs are metanephric kidneys, ureter open in the cloaca and nitrogenous wastes are excreted in the form of semisolid urates
1096. Females have only left ovary and oviduct is well developed ETEA-2016
1097. Females have shell secreting shell

1098.	Flightless birds are also called	Running birds
1099.	Flightless birds have not hollow bones and not keeled sternum and feathers are	Irregularly arrangement
1100.	Flying birds have strong wings for fight and	Keeled sternum
1101.	Ostritch, emu, kiwi, cassowary, penguin are examples are	Flightless Birds
1102.	Pigeon, sparrow, parrot, eagle, owl are examples of	Flying birds

CLASS MAMMALIA

1103.	The characters which placed mammalian on top of evolutionary tree is due to	Brain & nervous system development
1104.	Ancestors of mammals lived with reptiles in Jurassic period and are called	mammal like reptiles
1105.	Fossil animal recovered from texas which has 50% mammalian character is	Varanope
1106.	The ancestors of mammals were of the size of mice and lived on	Trees ETEA-2010
1107.	Mammals become dominant in	Cenozoic period
1108.	Mammals have two pairs of	Pentadactyle limbs

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1109.	In mammals brain is well developed with two large cerebral hemisphere and	12 pairs of cranial nerves
1110.	Only left aortic arc is present in	mammals
1111.	Besides mammals, diaphragm is present in	crocodiles
1112.	In mammals, blood is red due to presence of haemoglobin in biconcave	Non nucleated RBCs
1113.	In mammals the embryo is kept inside the female body for development and this process is called	gestation
1114.	Mammals are also called	Amniotes
1115.	**Mammals are divided into three subclasses:** 1. Prototheria or montremata 2. Metatheria or marsupials 3. Eutheria or placentalia	
1116.	Prototheria or montremata are most primitive animals and are also called	Egg lying animals **ETEA-2008**
1117.	Calass Metatheria / Marsupials are also called	Pouched mammals
1118.	There is no connection between body of mother and foetus in	Prototheria / montremata
1119.	The Prototheria or montremata animals are rightly be called as	Ovo-viviparous
1120.	Young birth are in immature form and nourished by treats present on ventral side of the body in females until they enough grow, are about	Prototheria / montremata
1121.	Prototheria are restricted to Australian Tasmania, New Guinea and their	Neighbouring island
1122.	In adults teeth are absent and beak are found in	Prototheria / montremata
1123.	The body temperature of Prototheria / montremata are about	25 – 28 °C
1124.	On ventral side of female of Metatheria / Marsupials bear a pouch called	Marsupium
1125.	There is no placenta formation but teats of mammary gland are present in pouch in	Metatheria / Marsupials
1126.	Marsupials are also restricted to Australian region except	American opossum
1127.	Their body is covered with hairs and are terrestrial and	Arboreal (live in trees)
1128.	Eutheria or placentalia are also called	Placental animals
1129.	In Eutheria or placentalia, cloaca is absent and urino-genital duct opens	Indefinitely of rectum
1130.	Eutheria are divided into	Sixteen orders
1131.		

Subclass	Examples		
Prototheria / montremata	Duck billed platypus (*Ornithorhynchus*) Spiny ant eater (*Tachyglossus*)		
Metatheria / Marsupials	Kangroo, opossum & Koala **ETEA-2019**		
Eutheria / placentalia	Insectivore	Moles & shrews	
	Chiroptera	Bats & flying squirrels	Flying mammals **ETEA-2010**

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		cetecea	Whale, dolphin, porpoises, sea loin	Aquatic mammals
		Carnivore	Dog, cat, loin, wolves	Flesh eating
		Rodentia	Rate, mice, squirrel, beavers	Cutting habit
		Edentate	South American anteater, sloths	No or poorly teeth
		Pholidata	Penguin	Body with overlapping large & horny scales
		Proboscidea	Elephant	Long trunk
		Perissodactyla	Hose, zebra	Odd-toed hoofed mammals
		Artiodactyla	Cow, goat, deer	Even-toed hoofed mammals
		Primates	Ape, man, monkey, lemur tarsier	Highest brain development

	MIX	
1132.	Tissue organization is missing in	Protozoa
1133.	Tissue organization in present in	Metazoan
1134.	Round worms, which have body cavities partially lined with mesoderm are classified as	Pseudo coelomates
1135.	Daphnia belongs to	Crustacean
1136.	Feathers of birds are waterproof due to secretion of	preen gland
1137.	In fishes the heart pumps	Impure blood to gills
1138.	Nematocysts are found in	Coelenterates
1139.	Teeth adopted for cutting are	Incisors
1140.	The main excretory organ in cockroach is	Malpighian tubes ETEA-2009
1141.	The number of legs in scorpion are	Four fairs
1142.	Vertebrate with one occipital condoyle is	Pigeon
1143.	The existence of an organism in more than one for is known as	Polymorphism
1144.	In a pond ecosystem profundal none is missing because	Pond is shallow
1145.	Spiny ant eaters	Lay eggs
1146.	Protein is converted to peptone by	Trypase
1147.	Sudden as well as rapid mitosis leads to	Cancer
1148.	Organs of locomotion in earth worm are	Setea ETEA-2009
1149.	Plantigrad locomotion is found in	Man
1150.	Ammonoid mollusks are dominated on earth during period of	Triassic and Jurassic
1151.	Prothallus is	Hermaphrodite
1152.	Ferns have prostrate plant body that bears various sporangia on leaves called	Fronds
1153.	Wings of a bird and fore limbs of man are	Homologous
1154.	The association in which an organism get advantage and the other get suffers are	Parasitism

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1155.	The modern horse is called	Equus
1156.	Important characteristic of coelenterates	Polymorphism ETEA-2014
1157.	In Platyhelminthes, regeneration ability is present in class	Tubellaria(planaria)
1158.	In Platyhelminthes, regeneration ability is absent in class	Trematoda(liver flukes) and Cestoda(tape worms)
1159.	Echinoderms have strong power of	Regeneration
1160.	In Earth worm 4-5 pairs of heart present called	Pseudo-hearts ETEA-2013
1161.	Metamorphosis occur in	Arthropodes
1162.	Urochordates are also called tunicate as theyhave sheeth called tunic which is made	Of tunicin

Phylum	Examples
Phylum porifera	Sycon(marine), Spongille(fresh water), ETEA-2014 Leucoselenia(marine), euplectella (flower basket)
Phylum Coelenterata	Hydra, Obelia, Jelly fish, Sea anemone, Corels Portugese man of war ETEA-2015
Phylum Platyhelminthes	Planaria(Dugesia), liver flukes(fasciola hepatica), tape worms(taenia solium)
Phylum Aschelminthes Or nematode	Ascaris lumbricoides Enterobius vermicularis(pin worm)
Phylum Mullusca	Garden snail(Helix aspersa), Slug(Limax maximus), freshwater mussel (Anodonta grandis), Marine mussel(Mytilus edulis), Oyester(Ostrea lurida), Squid(Loligo pealii), Cuttle fish(Sepia officinalis), Octopus(Octopus bairdi) ETEA-2013
Phylum Annelida	Earthworm(Pheritema posthuma), ETEA-2014 Medicinal leech(Hirudinaria medicinallis), Neries
Phylum Echinodermata	Brittle star(ophiothrix fragilis), sea urchin(arbacia punctulata), sea cucumber(thyone briareus)
Phylum hemichordate	Acron worm(Saccoglossus kowalevskii) and balanoglosus sp.

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1163.	Cephalochordates are also called	Sea lancelet
1164.	In "Deovonian" period certain lobe fin fishes of group "Dipnoi" came to live in	Shallow water
1165.	Two tubes are present in amphibian which are	Truncus arteriosus & sinus venosus
1166.	Frog,toad(tailess), necturus(tailed), salamander, newt	Class amphibians
1167.	In reptiles teeth are present except in	Turtle and tortoise
1168.	Special sound box is present in birds injunction of	Trachea and bronchi
1169.	Birds are amniotes and have all the four extra embyionic membranes	Amnion, Chorion, Yolk sac, Allontoise
1170.	A fossil animal (named varanope) has been recovered ferom texas which has 50%	Mammalian character
1171..	Mammals become dominant in	Cenozoic period
1172.	Reptiles flourished in Mesozoic period	225-65 million years back
1173.	Modern reptiles are descendents of the Dinosaurs of jurrasic period195-136 million years back and Creraceous period	136-65 million years back
1174.	In arthropods excretion takes place in insects in	Malpighian tubules ETEA-2012
1175.	In arthropods excretion takes place in crustacean in	Green gland or coxal gland
1176.	Daphnia belongs to class	Crustacean
1177.		

Organism	Larve
Echinodermata	Bipinnaria
some annelids	Trochopora
Hemichordata	Tornaria
Mullusca(balanoglossus)	Glochidiam larva ETEA-2019
Amphibian	Tadpole

1178.	Circulatory system is of open type in a	phylum Arthropoda
1179.	Grasshopper, spider and scorpion belongs to	phylum Arthropoda
1180.	Of human body leg muscles are not	Vestigial
1181.	In hydra, planaria and earth worn the exchange of gases occur through the	General body surface
1182.	Tape worm has no	Digestive tube
1183.	Liver fluke, planaria and round worm have	Digestive system
1184.	Extra cellular digestion occurs in	Grasshopper & Frog
1185.	The oesophagus of earthworm open in	Intestine
1186.	Alveoli are absent in	Birds ETEA-2009
1187.	Sperm remain viable for years within female genital track of	Bat
1188.	Opossum belongs to	Metatheria ETEA-2009
1189.	Memetamerism is found in	Earth worm
1190.	Penguin is swimming	Bird
1191.	Extra embryonic membranes i.e. Amnion, Yolk sac, Chorion,	Reptiles

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	and Allontoise are present in	ETEA-2016
1192.	Cheatopterus includes in	Protosome
1193.	Book lungs are present in spider and scorpion which are	Arthropods ETEA-2014
1194.	All cell membranes are composed of	Lipo protein
1195.	Crocodile heart is of	Four chambered
1196.	Chest muscles are especially adopted for	Flight
1197.	Muscles, Gonads, blood vessels are derives from	Mesoderm
1198.	Liver is not derived from	Mesoderm
1199.	The number of nitrogenous bases common in both DNA and RNA are	Three
1200.	Influenza, AIDs, Hepatitis, Herpes, Poliomyelitis, leaf curl diseases	Viral diseases
1201.	The only human diseases known to be caused by viroid is	Hepatitis D
1202.		

Organisms	Chambered
Pisces (bony fishes)	2 chambered (1A 1V) ETEA-2010
Mullusca	2-3 chambered (1or2A & 1V) ETEA-2016
Amphibian	3 chambered (2A 1V)
Reptiles	4 chambered (2A 2V)
Birds	4 chambered (2A 2V)
Mammals	4 chambered (2A 2V)

1203.	The % of arthropods in animal kingdoms	75%
1204.	Middle ear is not present in fish while internal ear is	Present
1205.	The mesodermal cell which give rise to urinary system in frog is	Nephrotome
1206.	The digestion in Hydra and Planaria is both	Intra and extra cellular ETEA-2005
1207.	Rabbits, Pabulus, Rats, Grasshopers and Grasses constitute a	Community
1208.	Size of flower of chrysanthemum may be enlarged by removing	All floral buds except on
1209.	Genome of HIV consist of single strand of	DNA

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Parazoa					Phylum Porifera	Sycon(marine), Spongille(fresh water), Leucoselenia(marine), euplectella (flower basket)	Pinachocytes, choanocyte, Ameobocytes cells, Mylkospongida have skeleton, Excretion by diffusion
METAZOA or EUMETAZOA	Diplo-blastic	Radiata			Phylum coelenterates	Hydra, Obelia, Jelly fish, Sea anemone, Corels, Portugese man of war	Nematocyst, Mesogloe Polymorphism, Alternation of generation Planula LARVA
	TRIPLOBLASTIC	BILATERIA	Acoelomates		Phylum Platyhelminthes	Planaria(Dugesia), liver flukes(fasciola hepatica), tape WORMs(taenia solium)	Flame cells, Hermaphrodite Tape WORM, tanenia aginata
			Pseudocoelomates		Phylum Aschelminthes	Ascaris lumbricoides Enterobius vermicularis(pin WORM)	Pseudocelomates 27 million eggs → 2lac per day
			COELOMATES	PROTOSTOMES	Phylum Molluska	Garden snail(Helix aspersa), Slug(Limax maximus), freshwater mussel ,(Anodonta grandis), Marine mussel(Mytilus edulis), Oyester(Ostrea lurida), Squid(Loligo pealii), Cuttle fish(Sepia officinalis), Octopus(Octopus bairdi)	Second largest Radula → rasping tongue Wbscs in blood Haemocyanin Glochidiam l;arva
					Phylum Annelids	EarthWORM(Pheritema posthuma), Medicinal leech(Hirudinaria medicinallis), Nerics	Metamerically segmented Pseudo hearts, Nephridia Satea → earthWORM dn parapodia in nerics, trochopora LARVA, Hermaphrodite
					Phylum Arthropoda		Open circulatory system Gills and trachea, Malphigian tubules Metamorphosis
				DEUTEROSTOMES	Phylum Echinodermata	Brittle star(ophiothrix fragilis), sea urchin(arbacia punctulata), sea cucumber(thyone briareus)	Tube feet, Ten pair of pyloric caecae Respiration paule in star fish, peristomal gills and clocacal respiratory trackt in sea urchins, genital bursa in brittle star, Bipinnaria LARVA
					Hemichordate	Saccoglossis kowalevskii (acron WORM)	Tornaria LARVA
					Phylum Chodata	Acron WORM(Saccoglossus kowalevskii) and balanoglosus sp.	notochord

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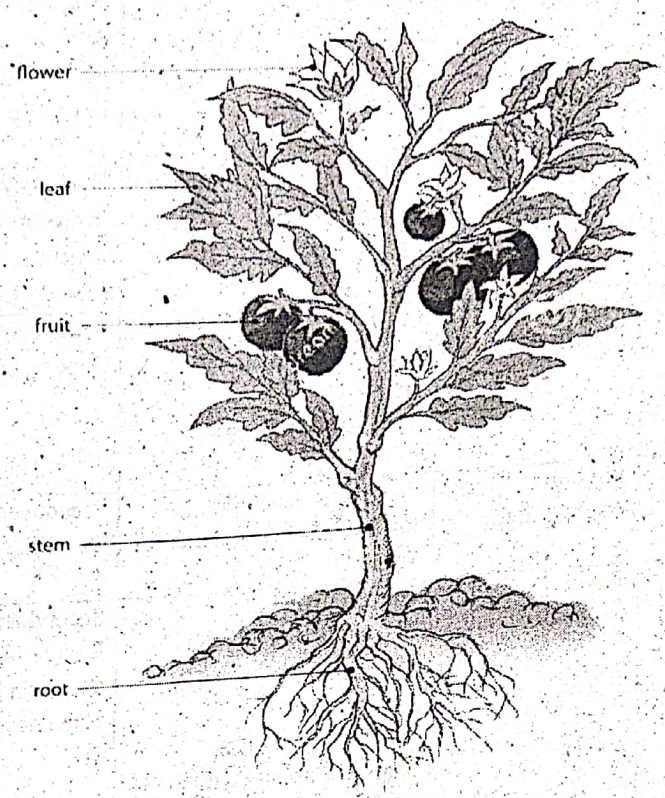
CHAP# 10 Forms & Funcions in plants



S.No	Questions	Answers
	PLANT NUTRITION	
1210.	Soil pH is one of the most important soil properties that affects the	Availability of nutrients
1211.	Macronutrients tend to be less available in soil with	Low pH
1212.	Micronutrients are tend to be less available in solid with	High pH
1213.	The following are a. carbon b. oxygen c. hydrogen d. nitrogen e. potassium f. calcium g. phosporius h. magnesium i. sulphur	Macronutrients ETEA-2015 ETEA-2017 ETEA-2019
1214.	The following are a. iron b. copper c. chlorine d. mangansese e. zinc f. molybdenum g. cobalt h. soidium	Micronutrients ETEA-2015 ETEA-2017
1215.	Lime can be added to soil to make it less sour(acidic) and also supplies	Calcium & magnesium
1216.	Lime also rises the pH to desire ranges of	6.0 – 6.5
	SPECIAL MODE OF NUTRITION IN PLANTS	
1217.	A classic passive trap is the "pifall trap" of pitcher plants,including Darlingtonia, Sarracenia of the sarraceniaceae and	Nepenthes of Nephenthaceae
1218.	Other passive trap of the "flypaper" or adhesive traps of sundews(drosera, Droseraceae) and butterworts (pinguicula,Lentobulariaceae), these two have	Gland tripped hairs (Dorcere)
	ROLES OF STOMATA IN GASEOS EXCHANGE AND TRANSPIRATION	
1219.	Small pores on epidermis of leaves are called	Stomata
1220.	In dicot plants, guard cells are of	Kidney/bean shaped

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1221.	In monocot stomata , guard cells are	Dumb bell shaped ETEA-2016
1222.	The inner wall of guard cells are	Thick and non-elastic ETEA-2015
1223.	The outer wall of guard cells are	Thin and elastic ETEA-2016
1224.	The adjoining cell walls of two guard cells around the pore are	Free, not attached to each other
1225.	The epidermal cells surrounding the guard cells are called	Subsidiary cells
1226.	The stomata pore, guard cells and the subsidiary cells are called	Stomata apparatus
1227.	Each guard cell contain single nucleus and numerous	Chloroplast
1228.	Starch are synthesized in guard cells by	Chloroplast
1229.	In mesophyll cells, accumulation of starch occur in	Dark or Night
1230.	In mesophyll cells, degradation of starch occur in	Light or Day
1231.	Mesophyll cells accumulate starch during the day and decrease during the	Day
	TRANSPORT IN PLANTS	
1232.	Xylem cells are elongated and are connected end to end to form a	Tubular water-transport
1233.	Tracheids are elongated cells to cells with secondary,lignified cell wall of	80 mμ wide
1234.	Functional tracheal conduits are surrounded by supports and storage cells including	Parenchyma fibers and Sclereids
1235.	Water moves from one vessel element to the next through	Proforations & pits
1236.	Vessel elements and companion cells are the characteristic of the	Angiosperms ETEA-2016
1237.	Companion cells are present in angiosperm and absent in	Gymnosperm and ferns ETEA-2015
1238.	Vessel element are wider, shorter, thinner-walled and less tapered than	Tracheids
1239.	Vessel element are individual cells linked together end to end to form	Xylem vessels
1240.	Phloem cells form the	Inner bark
1241.	The cells of the phloem that transport organic solute through the plant are	Sieve tubes
1242.	Phloem is present in all	Vascular plants
1243.	Sieve tubes are specially adopted for process of	Translocation
1244.	The cell wall of sieve tubes are made of	Cellulose
1245.	The perforated end of sieve tube is called	Sieve plate
1246.	Every cell tube is a thin walled elongated cell called	Companion cell
1247.	Companion cell is living cell which contain cytoplasm and	Elongated nucleus
1248.	The sieve tube and companion cell are in communication with each other by	Plasmodesmata
1249.	The companion cell supply energy to sieve tube and help in its	Translocation
	WATER STATUS I PLANTS	
1250.	Water potential is directly proportional to the concentration of the	Water-molecules
1251.	Greater the concentration of water molecules, greater will be the kinetic energy of water and this is called	Water potential
1252.	Pure water has	Maximum water potential

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1253.	Water potential and solute potential is measured in	Kilopascal
1254.	Water potential is affected by	Heat
1255.	Solute potential + pressure potential =	Water potential
1256.	The change in water potential due to the presence of the solute molecules	Solute / osmotic potential
1257.	Osmotic potential is equal to	Osmotic pressure
1258.	The turgor pressure produced by endosmosis of cell sap is called	Pressure potential
1259.	Pressure potential is just like pumping of water from	One place to another
	MOVEMENT OF WATER THROUGH ROOTS	
1260.	Water and mineral move in xylem by the way of appoplast, symplast &	Through vacuoles
1261.	The water which enters to the epidermal cells of root passes through cortex, endodermis, pericycle and finally to the	Xylem cells
1262.	The whole non-living pathway of water is called	Apoplast pathway
1263.	The system of interconnected cell walls and inter cellular spaces are	Apoplast pathway
1264.	A living transport of water through cortical cells by osmosis is called	Symplast pathway
1265.	A system of intercellular protoplast of cytoplasm is called	Symplast pathway
1266.	In the cells of the roots both the cell membrane and cytoplasm act as one	Partially permeable membrane
	WATER MOEMENT IN XYLEM THROUGH TACT MECHANISM	
1267.	Transpiration, adhesion, cohesion and tension are	TACT forces
1268.	The attached cells have interconnected	Vacuoles
1269.	Cells and vacuoles are interconnected with one another by	Plasmodesmata
1270.	When water move from vacuole to vacuole, it is called	Vacuolar pathway
1271.	Adhesion is the attractive force between water molecules and	Other substances
1272.	Cohesion is the force between molecules of the	Same substances
1273.	Water has high cohesive force due to	Hydrogen bonding
1274.	A combination of adhesion, cohesion and surface tension allow the water to climb on the wall of small diameter tubes like xylem and this is called	Capillary action
1275.	The U shaped surface formed by the water as it climb to the tube is called	Meniscus
1276.	A force that pulls water from the place where potential is greater is called	Tension
1277.	Tension is	Negative force
	MECHANISM OF OPENING AND CLOSING OF STOMATA	
1278.	High pH favours the activity of enzyme phosphorylase which convert starch into	Glucose and Phosphate
1279.	Guard cells become turgid and swell and thus stomata	Opens
1280.	Glucose is converted into starch at	Low pH
1281.	When carbondioxide is absorbed for photosynthesis which lowers the H+ of cell sap and pH of the guard cell	Decreases
1282.	In the presence of light starch is converted into	Phosphorylated hexose
1283.	Phosphorylated hexose is converted into	Phosphoenol pyruvic acid
1284.	Phosphoenol pyruvic acid combines with carbondioxide to produce	Malic acid
1285.	Malic acid dissociate into	malate ion and H+ ions
1286.	H+ cells are transported to epidermal cell and K+ ion are taken into guard cell in	Exchange of H+ ions

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1287.	Increase concentration of H+ ions and malate ions in the vacuole of the guard cell cause sufficient osmotic pressure to absorb water from surrounding and thus	Stomata opens
	TRANSLOCATION OF ORGANIC SOLUTES	
1288.	The transports of organic solutes from the source of assimilates to the sinks of assimilates is called	Translocation of organic solutes **ETEA-2016**
1289.	The movement of water, sucrose, hormones and amino acid is called	Translocation **ETEA-2016**
1290.	The accepted mechanism needed for the translocation of sugars from source to sink is called	Pressure flow hypothesis
1291.	In the phloem the loading of sugar into source produce a	Hypertonic condition
1292.	For translocation, suger is converted into	Sucrose
1293.	Water in the adjacent xylem moves into the phloem by	Osmosis
1294.	Active transport is needed for the removal of the sucrose out of the	Phloem sap into cells
	HOMEOSTASIS IN PLANTS	
1295.	Solute dissolved are less than that of cell or another solution	Hypotonic
1296.	Dissolved solutes are less outside the cell than inside	Hypertonic
1297.	Extensive specialized supporting tissues exist only in	Vascular plants
	OSMOREGULATION IN PLANTS	
1298.	Halophytes have special type of vegetation called	Mangrove
1299.	Halophytes are salt tolerators not salt	Lovers
1300.	The stem of halophytes are more developed for storage of	Water

Groups	Main characters	Examples
Hydrophytes	Root absent, absorb water by whole body,live in water or damp place	Hydrilla, Vallisneria, Potamogeton
Mesophytes	Ordinary plants, live in average condition	Citrus, Brassica, Pea, Peach and Rose
Xerophytes	Long roots ,desert plants, stem store water, leaves are spines/thorns, **cuticle** **ETEA-2016**	Cactus, Opuntia, Aloe, Ruscus, Acasia, Calotropics and Zizyphus **ETEA-2015**
Halophytes	In soil which have salts,	Mangrove, Salsola(saltwort), Rhizophora

SUPPORT IN PLANTS

1301. **Vascular plants have the following three main types of supporting tissues:**

S.No	Types	Further types
1	Collenchyma	Angular
		Annular
		Lamellar(plate)
		Lacunar
2	Sclerenchyma	Fibers
		Scleroids
3	Vascular tissues	---

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1302.	The word Collenchyma is derived from Greek word "kola" which means	Glue
1303.	The word Sclerenchyma is derived from Greek word "scleros" which means	Hard
1304.	The two groups of Sclerenchyma cells exists are	Fibres & sclereids
1305.	The wall of Sclerenchyma consist of	Cellulose or lignin
1306.	Sclerenchyma constitute the source material for many fibrics such as	Flax, hemp, jute & ramie
1307.	The fibers of xylem are always	Lignified
1308.	Fibers that do not belong to the xylem are	Bast (outside ring of cambium)
1309.	Fibers are so long, slender, so called	Prosenchymatous cells
1310.	Fibers occur in the form of	Strands or bundles
1311.	Totality of a stem's bundles are colloquially called	Fibers
1312.	The fibers of flax (Linum usitatissimum) have known in Europe and Egypt	Since more than 3000 year
1313.	The fiber ramie(Boehmeria nivea, a nettle) are extremely	Soft & elastic
1314.	Scleroid are short and are variable	In shape
1315.	The cells of scelroid may be isodiametric, prosenchymatic, forked or	Branched
1316.	Stone cells are present in	Pears & wax plants
1317.	Shell of seed like nut and drupes like cherries or plump are made of	Scleroids

GROWTH AND DEVELOPMENT IN PLANTS

1318.	Increases in size and number of cell is termed as	Growth
1319.	Meristems are undifferentiated, perpetually juvenile plant tissues which	Divide mitotically

1320. Meristematic tissues are of two types:

Types	Primary meristems	Give rise to
Apical meristem	Protoderm	Outer epidermis layer of root
	Ground meristem	Shoot cortex, ground tissue, pith, cortex
	Procambium	Primary vascular tissues, primary phloem, vascular cambium, primary xylem
Lateral meristem	**Types**	
	Vascular cambium	Secondary vascular tissues
	Cork cambium	Cork cells

1321.	The apical meristem give rise to three primary meristems which are protoderm, ground meristem and	Procambium
1322.	The inner most tissue is the pith which is produced by the	Central ground meristem
1323.	The function of central ground meristem for a short period as a	Storage tissues
1324.	The elongation is called	Primary growth
1325.	The increase in thickness of the plant is called or	Lateral growth
1326.	All vascular plants whether herbaceous or woody undergoes	Primary growth
1327.	Production of lateral branches leaves and flowers are occur by	Primary growth
1328.	Primary growth is found in most monocots and some	Herbaceous dicots
1329.	Lateral meristem are the cylinders of dividing cells found in	Gymnosperm & dicots
1330.	Cork cells protect the stem and the root from water loss, pathogens and	Herbivorous insects

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1331.	During the life of most dicots the growth present is	Secondary growth
1332.	From the procambium in the vascular bundles secondary cambium is formed which produces secondary phloem and	secondary xylem
1333.	In some species cork cambium that makes cork tissues develops from Parenchymatous cells in the	Cortex
	GROWTH CORRELATION	
1334.	The reciprocal relationship for growth among the different organs of plant is called	Growth correlation
1335.	The correlation may be Inhibitory or	Compensatory
1336.	The inhibition or control of lateral buds to develop by the activity of apical bud is called	Inhibitory correlation or apical dominance
1337.	In Complete apical meristem only the main shoot grows and the lateral buds are not allowed to develop as in	Sunflower ETEA-2014
1338.	In Incomplete apical meristem the growth of lateral buds are not under controlled which grow out to form a bushy appearance as in	Tomato
	ANNUAL RINGS	
1339.	When condition are ideal the annual ring is	Thick
1340.	In summer or other trouble the annual layer will be	Thin
1341.	The layers appear in the stump as a series concentric rings are called	Annual or tree rings
1342.	Each tree ring mark a line between the dark late wood and	Pale early wood
1343.	In annual ring formation the growth occurs in	Cambium
1344.	In spring the cambium divides and increase the diameter of the tree at two places	
	1 Outside the cambium	Become part of phloem ETEA-2016
	2 Inside the cambium	Become part of xylem
1345.	The tree add extra tissues and produce a thick ring when condition	Encourage growth
1346.	The growth is slow and the tree produces a thin ring in a	Discouraging year
	GROWTH RESPONCES IN PLANTS	
1347.	Hormones of plants are referred as	Phyto Hormones

Five major growth hormones:

S.No	Hormones	Controls
1	Auxins	Lengthening of shoot, differentiation of vascular tissue, initiate cell division, ETEA-2011 **inhibit growth in lateral buds,** ETEA-2012 maintain apical dominance,
2	Gibberellins	Restore normal growth, cause bolting in reset form plant, seed germination in grasses, produce enzyme from aleurone layer of endosperm, break dormancy of seed, cancel effect of inhibitory substances
3	Cytokinins	Promote cell division and bud formation, prevent senescene in leaves ETEA-2013
4	Abscisic acid(ABA)	Cause bud dormancy and seed dormancy, ETEA-2010 inhibit active growth of seedling flowering in long day and promotes abscesion,

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5	Ethylene	Its gaseous hormone, inhibit root growth and development auxiliary buds when present in high concentration, ETEA-2012 stimulate fruit ripening, ETEA-2017 - ETEA-2019

1348.	Auxin is a Greek word which means	To increases
1349.	Auxins are hormone which are produced in the apical meristems of shoots	And tips of coleoptiles
1350.	Indole acetic acid with other related compounds are collectively called	Auxins ETEA-2012
1351.	The same quantity of auxin that promotes growth in stem inhibits growth in the	Main root system
1352.	The Gibberellins was first isolated from a Parasitic fungus, which cause abnormal growth in	Rice seedlings ETEA-2012
1353.	In apples and grapes the exogenous application cause more fruit set by	Gibberellins ETEA-2018
1354.	Gibberellins promote flowering, helps in growing seedless grapes and improves	Storage life of banana
1355.	Gibberellins are chemically related to the certain components of the	Nucleic acid
1356.	High concentration of auxin promotes Root formation and High concentration of cytokinins promotes Bud formation in	Tobacco pith culture
1357.	Cytokinins promotes the growth of lateral buds in	Intact plant
1358.	A substance that promotes abscission of cotton fruit was called	Abscission II
1359.	The Abscission II was later named "abscisic acid" due to its abscission and	Acidic nature
1360.	Substance which produce bud dormancy is called	Dormain
1361.	During stress, the concentration of abscisic acid increases which causes	Stomata to close
1362.	The leaf abscession involves decrease auxin and increases	Ethylene production

PLANT MOVEMENTS

1363. **Plants movement are classified into two major types:**

Growth movement	Autonomic movement	Nastic/nutation	e.g zig zag growth of stem of plant	
		Epinasty ETEA-2018	e.g opening of buds: upper part of leaf grow more than lower part of leaf	
		Hyponasty	e.g closing of buds: upper part of leaf grow less than lower part of leaf	
	Paratonic movement (movement by external stimuli)	Tropic movement (in any direction)	Phototropism	Light
			Geotropism	Gravity
			Hydrotropism	Moisture
			Chemotropism	Chemical ETEA-2009
			Thigmotropism	Touch, contact, friction
		Nastic movement	Photonasty	Light e.g oxalis plant
			Thermonasty	Temperatur e.g

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				crocus,tulips
			Seismonasty	Touch, friction e.g mimosa pudica
		Tactic movement	Phototactic	Light e.g chlamadomonas, volvex
			Thermotactic	Temp e.g unicellular algae
			Chemotactic	Chemical e.g spermatozoids
	Turgor movement	Rapid movement e.g touch me not		
		Sleep movement e.g bean plant		

1364.	The orientation of stem and roots in response to gravity is called	Geotropism
1365.	The root grow towards the gravity and show	Positively geotropic
1366.	The stem grows away from the force of gravity and show	Negatively geotropic
1367.	the tendrils are found in number of plants such as	*Passiflore, Lathyrus, & Smilax*
1368.	The pollen tube grows towards the egg in angiosperm due to disintegration of the	Synergid cell
1369.	Towards protein, salt of ammonia , phosphate tentacles of *Drosera* show	Positive chemotropism
1370.	Towards sugar and peptones the hyphae show	Positive chemotropism
1371.	Towards acid and alkali, the hyphae show	Negative chemotropism
1372.	the seismonasty movement is caused by the differential loss and support on the two sides of the	Pulvinus

PHOTOPERIODISM

1373.	The relative length of the day and night to which plant is exposed is called	Photoperiod
1374.	The response of plant towards the photoperiod is called	Photoperiodism
1375.	The critical day length is	11 hours
1376.	Critical day length for flowering for short day plants	15 1/2 ETEA-2015
1377.	Critical day length for flowering for long day plants	11 1/2
1378.	Short day plant produce flowers in spring when the day length is	shorter than critical value
1379.	Long day plant produce flowers in summer when the day length is	longer than critical value
1380.	Day neutral plant are independent to the length of the day they produce flowers whenever they	Mature

1381.

S.No	Plants	Examples
1	Short day plant	Tobacco, dahlia, soya bean & chrysanthemum ETEA-2013
2	Long day plant	Hibiscus, beet, spinach & potato
3	Day neutral plant	Maize, tomato, sunflower & cucumber

1382.	For short day plant, the critical value for flowering is	Maximum
1383.	For long day plant, the critical value for flowering is	Minimum

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PHYTOCHROMES		
1384.	Pigment which is sensitive to the transition between light and darkness is	Phytochrome
1385.	The pigment can exist in two forms	P_r & P_{fr}
1386.	The P_r forms absorb red light with a wavelength of 660 nm and converted to	P_{fr}
1387.	The P_{fr} forms absorb far red light with a wavelength of 730 nm and converted to	P_r ETEA-2015
1388.	The active form of pigment is called	P_{fr}
1389.	P_{fr} Promotes flowering in long day plants and inhibits in	Short day plants
1390.	P_{fr} is responsible for changes takes place in seedling, for germination of seeds	& for development of anthocyanins
1391.	A hormone that produced in leaves and travels through the phloem to the floral buds and initiates flower formation is	Florigen ETEA-2013
1392.	A Russian scientist named M.H Chailakhain proved by experiment in 1936 that florigen is produced in the	Leaves
1393.	M.H Chailakhain proved performed his experiment on short day plants name	Chrysanthemum
VERNALIZATION		
1394.	Vernalization is of Latin word meaning	Spring
1395.	The conversion of winter variety plant into the spring variety by low temperature treatment is called	Vernalization ETEA-2016
1396.	The term vernalization was coined by	Lysenko in 1928
1397.	Some plants required low temperature period before producing flowers if this condition is not fulfilled the plant	Will not produce flowers
1398.	If the germination seeds of winter wheat are exposed to low temperature, the plant produce by this seed will flower much	Earlier than other they done before
1399.	The plants which are stimulated by low temperature treatment are the parts of plants which receive stimulus of low temperature	Embryo of seed & apex of the stem
1400.	The temperature which is effective for vernalization is	4° C ETEA-2012
1401.	At 4° C, plant produce hormone a vernalin which induce	Vernalization ETEA-2017
1402.	Vernalization procedure is applied to sereal crops particularly wheat in Northern Europe during	1930 and 1940 ETEA-2015
1403.	In Northern Europe chilled winter varities are grown as	Spring varieties
MIX		
1404.	Abcissic acid is also called	Stress hormone
1405.	Auxins is Greek word which means	To increase
1406.	Herbaceous plants are often known for the	Attractive flowers / foliage
1407.	Support to the plant is provided by the mechanical tissue which are collenchyma &	Scelerenchyma
1408.	Non woody plants are supported by the turgidity(water pressure) of	Parenchymatous cells
1409.	The pressure of the cell pushing against the wall is called	Turgor pressure
1410.	Auxins controls the	Lengthening of shoot
1411.	Gibberellins cause the aleurone layer of the endosperm to	Endosperm

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	produce alpha-amylase which breakdown starch to sugar present in	
1412.	Auxins inhibits the growth of	Lateral buds
1413.	Gibberlllin, Axins, Cytokinins	Growth hormones ETEA-2015
1414.	The hormone that cause bud dormancy in plant is	Abscisic acid(ABA) ETEA-2012
1415.	Cytokinins promotes	Bud formation
1416.	The mechanism of leaf abscession involve decrease auxin and increase	Ethylene production
1417.	In xerophytes leaves are covered with	Cuticle ETEA-2014
1418.	Sunken stomata are present in	Xerophytes
1419.	Attraction of water molecule with another water molecule is called	Cohesion
1420.	Attraction of water molecules to the xylem vessels is called	Adhesion
1421.		

Xylem tissues ETEA-2012	Phloem tissues ETEA-2017
Tracheids	Sieve tubes
Vessel elements	Companion cells
Parenchyma	Phloem Parenchyma
	Phloem fibers
	Phloem ray cell

1422.	Ripening of fruit can be promoted by	Ethylene gas ETEA-2019
1423.	Opening and closing of stomata is controlled by	Sugar, Potassium and PH
1424.	Primary(N, P, K), secondary(Ca, Mg, S)	Macronutrients ETEA-2019
1425.	B, Cu, Fe, Cl	Micronutrients
1426.	Plants which feed on water mites	Utricularia
1427.	The cell that play vital role in the differentiation of different body parts are called	Mesodermal cells

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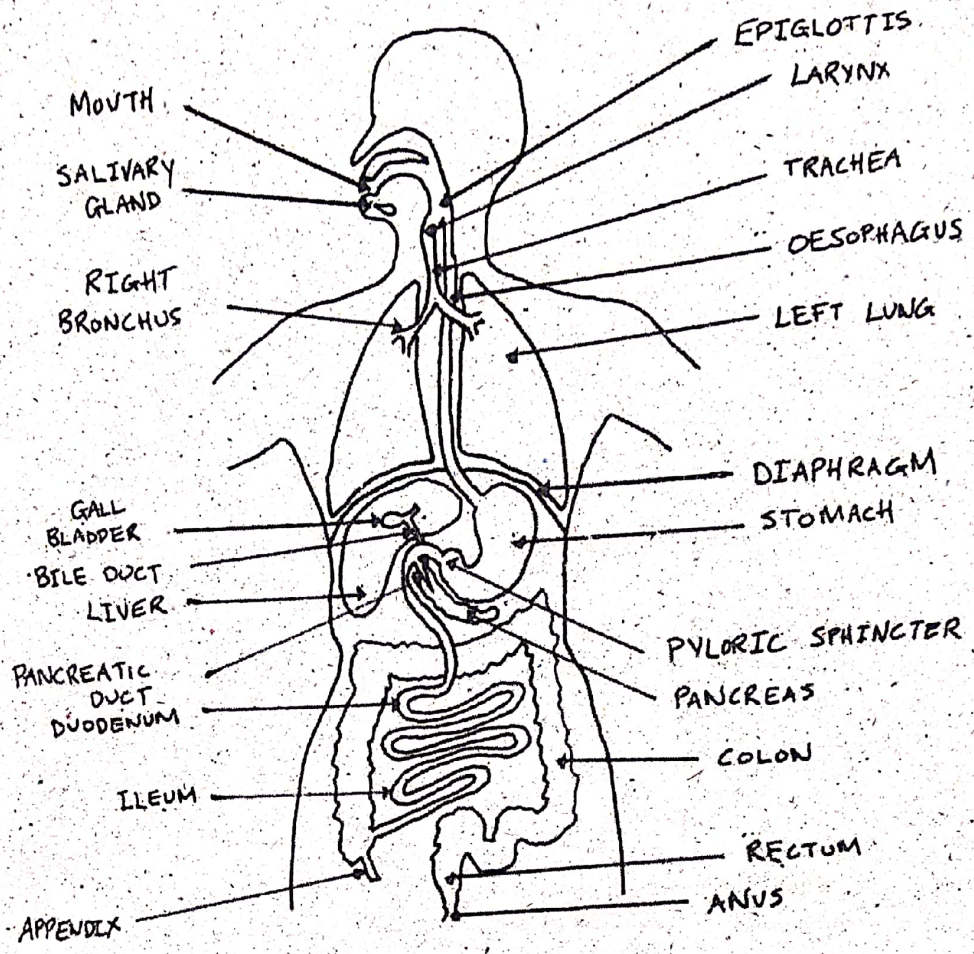
CHAP# 11 Digestion



S.No	Questions	Answers
1428.	INTRODUCTION	
1429.	Digestion begin in mouth and completed in	Small intestine
1430.	Digestive system is made of series of hollow organs connected to tube	From mouth to anus
1431.	The two solid digestive organs of digestive system are	Liver & Pancreas
1432.	MECHANICAL AND CHEMICAL DIGESTION IN THE ORAL CAVITY	
1433.	The chewing process is known as	Mastication
1434.	The mastication depends upon two powerful muscles	Masseter & temporalis
1435.	Mastication causes exocrine glands under the tongue and at the Back of the mouth to secrete	Saliva
1436.	Mastication causes exocrine glands to produce	Saliva
1437.	Saliva has two main functions moistens and compacts the food and	Digestive enzymes
1438.	Enzyme of saliva which start digestion of carbohydrates are	Salivary amylase
1439.	Almost no protein and no fat digestion occur in the digestion of the	Mouth ETEA-2010
1440.	An enzyme secreted by Ebner's gland on the dorsal surface of the tongue is	Lingual lipase ETEA-2019
1441.	The action of teeth and tongue prepare teeth for	Swallowing
1442.	The act of swallowing triggers two involuntary events, soft plate close the nasal cavity and	Epiglottis seal the trachea

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1443.	The swallowing process is regulated by the nerve in the	Medulla oblongata & pons
1444.	The speed of bolus is	3 – 5 cms^{-1}
1445.	A reflex action when the food enters to the trachea	Choking
1446.	**PHARYNGEAL STAGE, OESOPHAGUS STAGE AND FOOD IN STOMACH**	
1447.	The bolus is passed into the esophagus by Automatic contraction of	Pharynx
1448.	Bolus travels to the esophagus by	Gravity & reflex action
1449.	The smooth muscle contraction is called	Peristalsis
1450.	The valve present between esophagus and stomach is	Cardiac sphincter
1451.	The valve present between stomach and small intestine is	Pyloric sphincter **ETEA-2012**
1452.	The valve present between small intestine(ileum) and large intestine is	Ileocecal valve
1453.	**The time of food to travel from/through:** 1. Mouth to stomach is 4-8 seconds 2. Stomach into the duodenum is 4-5 hours 3. All three sections of small intestine is 4-5 hours	
1454.	Peristalsis occur throughout the length of digestive tract and its sound is	Occasional strange sounds
1455.	The digestive tract is surrounded by smooth muscle of both	Circular and longitudinal
1456.	The digestion of food in stomach is	Physical & chemical
1457.	**Stomach volume:** Empty stomach volume: 50 ml Volume after a meal: 1 L Maximum volume capacity: 4 liters	
1458.	**Structure of stomach: it's subdivided into four regions** 1. The cardiac region 2. The fundus 3. The Body 4. The Phylorus	
1459.	**Several kind of cells are present in the gastric glands which are as follow:** Parietal cells: HCl & intrinsic factor Chief cells: Pepsinogen **ETEA-2015** Mucus secreting cells: Mucus Hormone secreting cells: Gastrin	
1460.	The concentration of H+ in the gastric juice is as high as	0.15 M
1461.	The pH of gastric juice is somewhat less than	1
1462.	Intrinsic factor bind with vitamin B-12 and enables it to be	Absorbed
1463.	Pepsinogen is the precursor to the proteolytic enzyme	Pepsin
1464.	Ulcer is caused by a bacteria called	*Helicobacter pylori bacterium*
1465.	**GASTRIC JUICES MECHANISM**	
1466.	Secretion of gastric gland is secreted by hormone called	Gastrin **ETEA-2015**

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1467.	Gastrin is released by endocrine cells in the	Stomach
1468.	The drugs which are absorbed from the stomach to blood are	Iron, Aspirin & Ethanol
1469.	The absorption of food and water by the stomach is	Negligible
1470.	When food never reached to stomach, the amount of secretion of gastric juice is	One forth
1471.	If proteins are more in food, the brain give order to gastric gland to produce more	Gastric juice
1472.	Protein molecules stimulate the endocrine cell of the stomach to	Secrete gastrin
1473.	Sub-lingual gland, parotid gland and sub-mandibular glands are	Salivary glands

1474. **DIGESTIVE ORGANS LENGTHS**

1475.

Parts	Length
Duodenum	10 inch
Jejunum	4-7 feet
Ileum	5- feet
Small intestine	17 feet
Large intestine	5 feet
Anal canal	1.5 inch

1476. **DIGESTION IN SMALL INTESTINE**

1477.	The small intestine is also called	Small bowel
1478.	The longest section of the digestive tract is	Small intestine

1479. **In small intestine:**
1. Peptides are broken down into amino acids
2. Lipids(fats) are broken down into fatty acid and glycerols and sodium bicarbonate
3. Carbohydrates are broken down into simple sugar like glucose

1480.	In small intestine 76hime is mixed with	Bile from liver
1481.	The enzyme present in small intestine are Maltase, Lactase and	Sucrase
1482.	When nutrients are absorbed they flow through blood into	Liver
1483.	Much of mechanical digestion takes place in	Mouth
1484.	In mouth food is converted to	Bolus
1485.	In stomach, bolus is converted to a pulp called	Chyme
1486.	In small intestine, the 76hime is converted to	Watery mixture
1487.	In large intestine,watery mixture is converted from watery mixture to	Feces
1488.	Diameter of small intestine	3 – 4 cm
1489.	Diameter of large intestine	9 – 12 cm
1490.	The diameter of small intestine is 3 times narrower than diameter of	Large intestine
1491.	The word **duodenum** stems from Latin "duodenum digitorum" means	Twelve fingers or inches
1492.	The word **Jejunum** stems from Latin "jejunus" means	Empty

1493. **Duodenum(horse shoe shaped) is subdivided into four regions**
1. The superior
2. Descending
3. Horizontal
4. Ascending

1494.	Fats are broken down into small goblets by	Bile
1495.	The chemical break down of food is completed in	Jejunum
1496.	In gastric bypass operation, part of jejunum is bypassed to reduce	Caloric intake

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1497.	**ABSORPTION OF NUTRIENTS IN SMALL INTESTINE**	
1498.	The main function of ileum is to	Absorb nutrients
1499.	Bile is absorbed from digested food in	Ileum
1500.	The intestinal walls are covered with wrinkles called	Rugae
1501.	The Rugae are covered with millions of finger like projections called	Villi
1502.	The Villi are studded with millions of smaller projection called	Microvilli
1503.	The surface provided by small intestine to absorb nutrient absorption is	Size of tennis court
1504.	Excess glucose is converted to glycogen by liver in response to hormone called	Insulin **ETEA-2014**
1505.	The glycogen is re-converted into glucose by response of hormone	Glucagon
1506.	Formation of feces in large intestine id due to Mucus and	Bacteria(gut flora)
1507.	The peristalsis in small intestine is	Irregular intervals
1508.	The peristalsis of large intestine is	Continuous
1509.	To push materials towards rectum and anus a vigorous type of movement after 2-3 times a day is occur which is called	Gastrocolic reflex **ETEA-2009**
1510.	**DIGESTION IN LARGE INTESTINE**	
1511.	**Large intestine consist of four regions:** 1. The ceacum/cecum (short pouch) 2. The colon (longest part of large intestine) The colon is subdivided into four sections a. Ascending colon b. Transverse colon c. Descending colon d. Sigmoid colon 3. The rectum (final part of large intestine) 4. The anal canal	
1512.	The term which is sometimes used for large intestine is	Colon
1513.	**LIVER**	
1514.	The largest human organ is	Liver
1515.	Conversion of glucose into glycogen is called	Glycogenesis
1516.	Conversion of glycogen to glucose is called	Glycogenolysis
1517.	Conversion of non-sugars to glucose is called	Glyconeogenesis
1518.	Formation of fats(conversion of fatty acids and glycerol to fats)is called	Lipogenesis
1519.	Breaking of fats is called (conversion of fats to fatty acids and glycerol)	Lipolysis
1520.	Lipogenesis and lipolysis occur in	Adipose cells
1521.	The liver acts fast to convert ammonia(NH_2) into	Urea(NH_3) **ETEA-2013** **NMDCAT-2020**
1522.	Most of the body proteins are synthesized in	Liver
1523.	If proteins are **less** amino acid in liver are converted into	Proteins
1524.	If proteins are **more** amino acid in liver are converted into	Fat
1525.	The removal of nitrogen containing amino group(NH_2) is called	Deamination
1526.	The liver's own phagocytes which reside within the lobules are	Kupffer cells **NMDCAT-2020**
1527.	Kupffer cells destroy invading bacteria and	Debris in liver **NMDCAT-2020**

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1528.	The product of breakdown of old blood cell is	Bilirubin
1529.	The hepatocytes of liver absorb **vitamins** such as	A, B_{12}, D, E, K
1530.	The hepatocytes of liver absorb **minerals** such as	Iron & copper
1531.	The colour of bile are	Yellowish – green
1532.	Water, bile salts, cholesterol, phospholipids, electrolytes and bile pigments are constituent of	Bile
1533.	Bile enters to duodenum emulsifying fat into	Globules
1534.	**PANCREASES**	
1535.	The colour of pancreas is	Light tin or pinkish
1536.	**Pancreas is divided into three regions:** 1. The head 2. The body 3. The tail	
1537.	The body and tail of pancreas extends towards the	Hilum of spleen
1538.	The pancreatic duct is also called	Duct of Wirsung
1539.	Pancreatic juice & bile from liver empties from ducts to duodenum via	Ampulla of Vater
1540.	The bulk of pancreas is composed of pancreatic exocrine cells and	Associated ducts
1541.	Roughly one million cluster of cell,present in pancreas is called	*Islets of Langerhans* **ETEA-2015**
1542.	The main components of pancreas are Acinar cells and	Ducts
1543.	The acinar cell and duct make the total pancreatic mass of	80 – 90%
1544.	In each acinus(acinar) another type of cell is present called	Centroacinar cells
1545.	The cells which are responsible for fluid and electrolyte of pancreas Centroacinar cells and it is helped by	Interlobular ducts
1546.	The contents of acinus drains into small intercalated ducts from where it passes into	Pancreatic duct
1547.	The mass occupied by *Islets of Langerhans* in pancreas is	2% **ETEA-2008**
1548.	***Islets of Langerhans* consist of following four major cell types:**	

Cells type	Secretion	
		ETEA-2014
Alpha (A)	Glucagons	**ETEA-2019**
Beta (B)	Insulin	
Delta (D)	Somatostatin	
F	Pancreatic polypeptide	

1549.	The final product of pancreas is colourless and alkaline fluid that contain digestive enzyme such as	Amylase, lipase & trypsinogen **ETEA-2007**
1550.	The amount of pancreatic fluid secreted per day is	500 – 800 ml
1551.	Amylase, lipase and protease are	Isozymes
1552.	Isozymes are synthesized in endoplasmic reticulum of acinar cells and are packaged in	Zymogen granules
1553.	Isozymes are released from lumen of the acinus and then transported to the duodenal lumen where the enzymes are	Activated
1554.	The only digestive enzyme which is secreted by pancreas in active form is	Amylase

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1555.	PH of amylase is	7
1556.	PH of Lipase is	7 – 9
1557.	Starch and glycogen are hydrolyzed to glucose by	Amylase
1558.	Fats are hydrolyzed in presence of bile salts by	Lipase
1559.	Duodenal enzyme, enterokinase converts trypsinogen to trypsin which in turn activates chymotrypsin, elastase, carboxypeptidase and	Phospholipase
1560.	The first hormone to be discovered was	Secretin
1561.	In response to acid in small intestine, the hormone released is	Secretin
1562.	Secretin is also known as	Fireman
1563.	Secretin is secreted, in response to one known stimulus	Duodenum acidification
1564.	The principle target for secretin is pancreas by secreting a	Bicarbonate fluid
1565.	Digestion is completed in	Small intestine
1566.	Bile enters to the duodenum and convert fats into small	globules
1567.	Gastric glands secrete juices after each meal an amount of	400-800ml
1568.	Intrinsic proteins attached to vitamin B12 to make it	Absorbable
1569.	*Helicobacter pylori bacterium* cause	Ulcer
1570.	The longest section of digestive track is	Small intestine(27 feet)
1571.	The largest organ in human body is	Liver
1572.	Bile produced by liver are stored in	Gall bladder
1573.	Intestinal valve are covered with wrinkles called	Rugae
1574.	Excess glucose is converted to glycogen in liver on response of hormone called	Insulin
1575.	Glycogen is converted to glucose on response of hormone called	Glucagon
1576.	Food is propelled to rectum and anus by movement called	Gastrocolic reflex
1577.	The longest segment of large intestine is	Colon
1578.	20-40 acinar cells join and form a unit called	Acinus **ETEA-2017**
1579.	Acinar cells and ducts are components of	Pancreas
1580.	Amount of pancreatic fluid per day is	500-800ml **ETEA-2010**
1581.	Final product of pancreas is colourless, odourless and	Alkaline
1582.	The first hormone to be discovered is	Secretin
1583.	2 week course of ulcer is called	Triple theraphy
1584.	After pregnancy, women get weight of	4-6 pounds(1pound=0.4kg)
1585.	*Helicobacter pylori* may be transmitted from person to person through	Cantaminated water &food
1586.	ULCER	
1587.	Excess secretion of HCl, genetic predisposition and physiological stress are important contributing factors in the formation of the	Duodenal ulcers
1588.	The peptic ulcers caused by bacteria are about	60%
1589.	The two week course of ulcer relalted with H.pylore is called	Triple therapy
1590.	Triple therapy consist of two antibiotic drugs, one to kill bacteria and the other to	Acid suppressor
1591.	Acid suppressor antibiotic is also called	Stomach-lining shield medicine
1592.	OBESITY	

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1593.	Increase in total body fat is called	Obesity
1594.	If we loss weight after gaining the size of fat cell decreases but their number	Remain constant
1595.	Age, sex, gene, physiological makeup and environmental factors contribute	Obesity
1596.	On average, the muscles in man and woman are generally	More in man than woman
1597.	Woman have less muscles so they gain weight easily than	Man with same food
1598.	After pregnancy the weight of woman is increase by	4-6 pounds(1pound=0.4kg)
1599.	Hypothyroidism, crushing syndrome and depression are drugs which	Promote obesity
1600.	Method to determine we are obese are not we use the method	Body mass index
1601.	Multiply weight in pounds by 705 then divide by height in inches and again divide by inches in second time	Body mass index

1602. **ETEA-2017**

Normal BMI	18.5 – 24.9
Over weight	25.0 – 29.9
Obese	30 or greater
Morbidly obese	40 or greater

1603.	**BULIMMIA NERVOSA**	
1604.	Person may eat a lot of food at once and then try to get rid from it by vomiting, using laxatives or sometimes by over exercise	Bulimia nervosa **ETEA-2014** **ETEA-2018**
1605.	Bulimia can lead to nutritional deficiency and even fetal	Complications
1606.	**ANOREXIA NERVOSA**	
1607.	Fear of gaining weight due to which people maintain weight fair less than normal	Anorexia nervosa
1608.	Anorexia must commonly affect	Adults
1609.	The most successful treatment is combination of psychotherapy, family therapy and medication for	Anorexia nervosa
1610.	**FOOD POISNING**	
1611.	Sudden illness caused by eating or drinking liquids contaminated by Toxin or infectious organism is called	Food poisoning
1612.	Clostridium botulinum bacterium(Botulism) causes muscle weakness and	Paralysis
1613.	Listeriosis may cause flu-like symptoms and leads to	Meningitis
1614.	Most types of food poisoning causes	Diarrhea or vomiting

1615. **Majority food poisoning:**
1. Escherichia coli
2. Staphylococci
3. Salmonella
4. Campylobacter

1616.	Without treatment the signs of food poisoning	Disappear
1617.	It need to talk to doctor, if symptoms of food poisoning persist for more than	3 – 4 days
1618.	Treatment of food poisoning is usually aimed at preventing	Dehydration
1619.	If bacteria spread in food poisoning there is a risk of	Septicemia
1620.	In food poisoning, both dehydration and septicemia can cause shock,	fatal

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	a condition that is sometimes	
1621.	DISEASE CHART	
1622.		

Diseases	Signs & symptoms
Obesity	Exercise (for 30 min), medications, Low fat and high fiber die, high carbohydrate, social support and change in eating behavior
Bulimia Nervosa	High carbohydrate food in secret , lack of menstrual period in woman
Anorexia nervosa	Weight loss, very rare menstrual period, dry skin, thin hairs, upset stomach, low b.p, fatigue, abnormal heart rhythm, osteoporosis
Food poisoning	Pain in upper abdomen, often eat worse by eating and nausea particularly in the morning

1623.	DYSPEPSIA	
1624.	Pain or discomfort in the upper abdomen that is not associated with structural abnormality is called	Dyspepsia
1625.	Indigestion without an identifiable cause or abnormality of the digestive tract is called	Dyspepsia
1626.	Dyspepsia is more common in men and may be worse by stress, obesity, smoking and a diet high in	rich, fatty foods
1627.	Patients with non-nuclear dyspepsia often experience symptoms several time	A week for months
1628.	To look for abnormalities in gastrointestinal tract, we use upper digestive tract endoscopy or	Contrast x-rays
1629.	A test used to check for the infection of the stomach lining from the bacterium *H.pylori* is	Blood test
1630.	Prevention of Dyspepsia: 1. Eat small portion of food after regular interval 2. Give enough time to digest food 3. Avoid rich, fatty food such as butter and fried foods 4. Learn to overcome stress 5. Avoid tight fitting dress 6. Reduce weight if you are over weight 7. Avoid medicine that irritate the digestive tract	
1631.	Medicine that irritate the digestive tract are aspirin and other Nonsteroidal	Anti-inflammatory duct
1632.	When we eat more calorie than our body need, is called	Obesity
1633.	Eating disorder in which person may eat a lot of food at once and then try to get rid of it by vomiting, using lexaties, or ometimes oer-eccercising	Bulimia nervosa
1634.	An emotional disorder which deals with perfectionism and a desire to control things by strictly regulating food and weight	Anorexia
1635.	Recurrent and persistent indigestion that occurs witout identifiable cause	Dyspepsia

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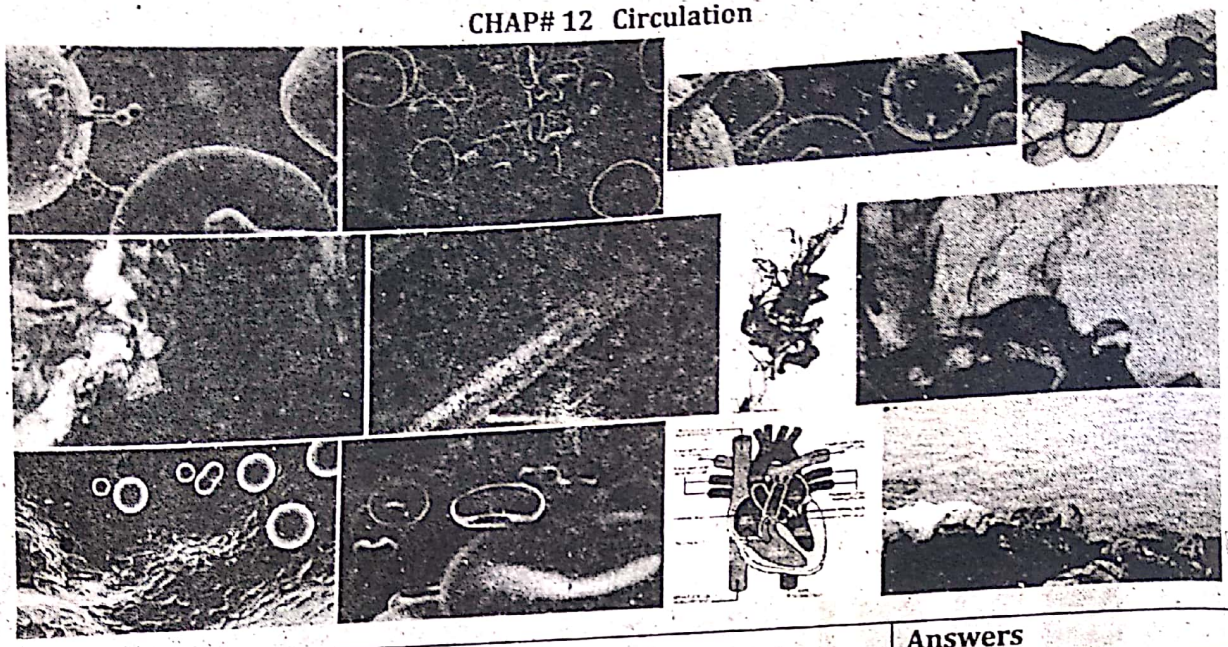
CHAP# 12 Circulation



S.No	Questions	Answers
1636.	**HUMAN BOOD CIRCULATORY SYSTEM**	
1637.	**The human circulatory system consist of** 1. Cardiovascular system,which distribute blood 2. Lymphatic system,which distribute Lymph	
1638.	Blood circulatory system is also called	Cardiovascular system
1639.	**HUMAN HEART**	
1640.	Human heart(Greek cardium) is a muscular pumping	Organ
1641.	Human heart is conical shape and its size is of	Tightened fist
1642.	Heart is covered by tough double membrane called	Pericardium
1643.	A cavity present between pericardium membranes is called	Pericardial cavity
1644.	The liquid present in the pericardial cavity is called	Pericardial fluid
1645.	Auricles are smaller and thin walled and are separated by	Inter-auricular septum
1646.	Ventricles are larger and thick walled and are separated by	Ventricular septum
1647.	Right atrium connect with right ventricle by valve called	Tricuspid valve **ETEA-2012**
1648.	Left atrium connect with left ventricle by valve called	Bicuspid valve **ETEA-2013**
1649.	The valves in the heart allow the blood to flows one	One direction
1650.	The largest vein in human	Vena cava
1651.	**CARDIAC CYCLE AND PHASE OF HEARTBEAT**	
1652.	One contraction and one relaxation is called a	Cardiac cycle
1653.	The time for one complete cardiac cycle is	0.8 s
1654.	Contraction of heart is termed as	Systole
1655.	Relaxation of heart is termed as	Diastole
1656.	The contraction and relaxation of heart is	Rhythmic & cyclic

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1657.	**Three phases of the heart cycle:** 1. First phase (blood flow to all chambers passively) 2. Second phase (both auricles contract for 0.1 s to full ventricles) 3. Third phase (ventricles contract for 0.3 s pouring blood to aorta and pulmonary artery)	
1658.	The sound produced by heart is generally verbalized as	Lub-dub
1659.	Lub (first sound) is produced by closing of the AV valves during contraction	of Ventricles in systole
1660.	Dub (second sound) is produced by closing of the semilunar valves in the	Beginning of the diastole
1661.	Normal rate of heart beat in normal human being is	72 beats per minute
1662.	When a person is resting or sleeping the rate of heart	Decreases
1663.	In exercise or medicine like caffeine, the rate of human being increases to	120 beats per minutes
1664.	The amount of blood pours by heart every time is	85 milliliters
1665.	The speed of blood is fastest in arteries, slower in arterioles and slowest in	Capillaries
1666.	The speed of blood fast in venules and faster in	Veins again
1667.	The speed of blood fluctuates from 425 cm/sec in the aorta and about less	than 1 mm/min in vein
1668.	**The continuous working of heart is due to certain specialized structures such as** 1. SA nodes (also called pacemaker) 2. AV node 3. Purkinji fibers(by Jan Evangelista Purkyne in 1839)	
1669.	The node present on the upper dorsal wall of the right atrium of the heart	SA node
1670.	SA node initiates the electrical impulse and keeps the heart in	Motion
1671.	SA node is sometimes called	Primary pacemaker
1672.	Dysfunction of SA node causes disturbance in the Heat beat, either it becomes	Fast, slow or both
1673.	The main function of AV node(atrio-ventricular node) is to coordinate	Heart rate
1674.	AV node is the relay station between the atria and the ventricles by	Encyclopedia Britannica
1675.	To reach to ventricles, electrical signals must pass from through	AV nodes
1676.	Purkinji fibers are the extension of the	Autonomic nervous system
1677.	ELECTROCARDIOGRAM (ECG)	
1678.	The overall electrical current of the heart goes toward a particular lead , it registers a	Positive deflection
1679.	Those electrical current which goes away from lead register a	Negative deflection
1680.	Those electrical current which are perpendiculoar to the vector of the lead register as	0

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1681. **The wave shape produced by ECG is called QRS wave, each stage are as follow:**

TP interval	Ventricular diastole
P wave	Atrial systole
QR interval	End of ventricular Diastole
RS interval	Ventricular systole
ST segment	Ventricular systole
T wave	Ventricular diastole

1682. BLOOD VESSELS

1683. **The circulatory system consist of three blood vessels:**

S.No	Vessels	Carry blood		Pressure	
1	Arteries	Away from heart	Very elastic	2 mm Hg	Red colour
2	Veins	Towards hear	Less elastic	100 mm Hg	Bluish

1684.	All arteries carried oxygenated blood away from heart except	Pulmonary artery
1685.	All veins carry deoxygenated blood towards heart except	Pulmonary vein NMDCAT-2020

1686. **The wall of arteries are made of three layers:**
1. **Tunica externa** (outer elastic layer, areolar tissues)
2. **Tunica media** (composed of circular arranged smooth muscles and fewer elastic fibers)
3. **Tunica interna** or endothelium (Layers of elastic fibers, composed of simple squamous epitheliuma and thin layer of the areolar connective tissues).

1687.	Small arteries present in the very large blood arteries called	Vasa vasorum
1688.	Vasa vasorum (vessels of vessels) are also present in the	Tunica externa
1689.	Diameter of arterioles are	3mm – 10 µm
1690.	Diameter of capillary is little more than RBC i.e	7.7 µm ETEA-2012
1691.	Diameter of venules are	8-100 µm
1692.	The smallest arteries are	Arterioles
1693.	Larger arterioles have all three layer but smaller arterioles have only two, a thin layer of endothelium surrounded by single layer of smooth muscle fiber means tunica externa is	Absent
1694.	Colour of oxygenated arteries are	Bright red
1695.	Colour of deoxygenated vein is	Bluish
1696.	The largest artery of human is aorta which arises from	Left ventricle
1697.	The largest vein in human being is	Superior vena cave
1698.	In circulatory system smallest blood vessels are	Capillaries
1699.	Superior vena cave brings the deoxygenated blood from	Head and upper region
1700.	Inferior vena cava brings the deoxygenated blood from	Lower body parts
1701.	Wall of vein is composed of same three layers of artery but the middle layer is	Thinner to that of artery
1702.	A sphincters which is present between arterioles and capillaries which control of amount of blood flow is called	Precapillary sphincter

1703. **Humans and other mammals have two-circuit circulatory system:**
1. One for pulmonary circulation (circulation to the lungs)
2. Circuit for systemic circulation (circulation for the rest of body)

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1704.	In the alveoli of the lungs oxygen bind with heam part of	Haemoglobin
1705.	Due to pressure of blood some water also oozes out of the capillaries as	Interstitial fluid
1706.	The SA node(sine-atrial node node) is the pacemaker which generate	Impulse
1707.	Human circulatory system is closed system while lymphatic system is	Open system
1708.	The time foe ne complete systole and diastole is	0.8 seconds
1709.	Normal heart beat of human being is	72 beats per minute
1710.	Every time heart pours blood of about	85 mm
1711.	Speed is fastest in arterioles and slowest in capillaries and fastest in	Veins
1712.	The speed of blood fluctuates in the aorta is	425cm/sec
1713.	SA(sino-atrial node) node is sometimes called	Primary pacemaker
1714.	Purkingi fibers were discovered in 1839 by	Jan Evangelista Purkyne
1715.	The blood supply in blood vessels are called	Vasa Vasorum
1716.	The largest artery of the body is	Aorta
1717.	The sphincter present between arteriole and capillary is called	Precapilary Sphincters
1718.	Pressure in arteries is	100 mm Hg
1719.	Pressure in vein is	2mm Hg
1720.	**CONTROL OF THE CAPILLARY BUDS**	
1721.	Blood supply to the brain remains	Constant
1722.	(1mile=1.609km) and the Length of capillary is	60,0000 miles
1723.	Surface area of capillaries	800-1000m²
1724.	The diameter of human artery is	3 mm to 10 µm
1725.	The diameter of capillary is little more than the RBC i.e.	7.5 µm
1726.	The total volume of system blood is roughly	5 liters

1727. **Showing blood flow in millimeter/minute:**

Organs	At rest	At exercise
Heart	250	750
Skin	400	1,900 ETEA-2012
Skeletal muscles	1,000	12,500
Kidney	1,200	600
Viscera	1,400	600
Other	600	400
Brain	750	750
Total	5,600	17,500

1728.	**BLOOD PRESSURE**	
1729.	The force per unit area that blood exerts on inside of the wall of blood vessels is called	Blood pressure
1730.	Blood pressure is measured with the help of instrument called	Sphygmomanometer
1731.	**Blood pressure are of two types:** 1. Systolic blood pressure (felt during ventricular contraction) 2. Diastolic blood pressure (felt during ventricular relaxation)	
1732.	An average, adult human being is blood pressure of	120 / 80
1733.	With increase of age the blood pressure also increase because of	Blood vessels

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	the decrease in the elasticity of the	
1734.	The blood pressure is generated by the contraction of the	Left ventricle
1735.	In capillaries the pressure between systolic and diastolic pressure	Disappears
1736.	When the blood enters to the right atrium its blood pressure is almost	Zero
1737.	**Blood pressure in different blood vessels:**	

Vessels	Systolic B.P	Diastolic B.P	B.P
Aorta	120	80	
Arteries	102	60	
Arterioles	60	45	
Capillaries			40
Venules			20
Veins			10
Vena cava			0

1738.	Certain sensors(nerve endings) are located in the blood vessels of the human body called	Baroreceptors/barocepto rs
1739.	The short term for blood pressure regulation mechanism is used for	Baroreceptors
1740.	**Baroreceptors can be divided into two types:** 1. High pressure arterial baroreceptors 2. Low pressure baroreceptors (also called cardiopulmonary or volume receptors)	
1741.	High pressure arterial baroreceptors are present in the aortic arch and the carotid sinuses of the left and right	Internal carotid arteries
1742.	Baroreceptors found within the aortic arch enable examine of blood flow to	All blood vessels
1743.	Baroreceptors found in the carotid arteries monitor the blood flow to the	Brain
1744.	Low pressure baroreceptors are found in the large systemic veins and in the	Wall of right atrium
1745.	The low baroreceptors have both circulatory and	Renal effect
1746.	The renal effect allow the receptors to change the mean pressure in the	System in the long term
1747.	THROMBOSIS AND EMBOLISM	
1748.	Thrombus is of Greek word means	Blood clot
1749.	The disorder in which a person generate thrombus in the vessel is called	Thrombosis
1750.	Thrombus is formed by the aggregation of the platelets inside the	Vessels
1751.	**Risk of thrombosis increases in certain conditions such as:** 1. Atrial fibrillation 2. Heart valve replacement 3. Recent heart attack 4. Extended periods of inactivity	
1752.	A thrombus which dislodges and become free-floating is termed as	Embolus
1753.	The term embolus was first coined by the	Rudolph Carl Virchow in 1848
1754.	In thromboembolism, the thrombus from a blood vessel is	Thrombosis

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	completely or partially detached from the site of the	
1755.	In coronary thrombosis, thrombus blocks a coronary artery causing	Coronary thrombosis
1756.	Coronary thrombosis is commonly known as	Heart attack
1757.	If thrombus block an artery to the brain, it is called as	Stroke
1758.	A stroke may result in sudden death or	Paralysis of the body
1759.	**ATHEROSCLEROSIS**	
1760.	The work atherosclerosis is a Greek word where arthere means porridge and skeleoris means	Hardening
1761.	Condition in which the walls of artery thickens as the result of the deposition of the fatty material such as cholesterol	Atherosclerosis **ETEA-2016**
1762.	Atherosclerosis develops from low density lipoprotein molecule (LDL) becoming oxidize by	Free radicals
1763.	The body's immune send specialized WBCs called macrophages and T-lymphocytes to absorb the oxidize-LDL, forming specialized	Form cells
1764.	Narrowing of the artery reduces the blood flow and increases the	Blood flow
1765.	Atherosclerosis typically begins in the early	Adolescence
1766.	Hyperlipidemia(high level of fats in blood), hypertension and cigarette smoking increases the risk of atherosclerosis	Seven times
1767.	If atherosclerosis leads to symptoms like angina pectoris then it becomes necessary to	Start medication
1768.	Any hardening, stiffening or loss of elasticity of arterioles is called	Arteriosclerosis
1769.	The most common sites for arteriosclerosis are arteries in the brain, heart and	Abdominal aorta or legs
1770.	Leg pain indicate	Peripheral arterial disease
1771.	Sudden weakness or dizziness could be caused by an obstruction in the	Carotid artery in neck
1772.	Chest pain or symptoms of heart attack might indicate obstruction of the	Coronary arteries
1773.	**CONEGENITAL HEART PROBLEM**	
1774.	A defect in the structure of the heart and large blood vessels of a newborn baby is called	Congenital heart defect
1775.	In some babies right ventricle or left ventricle fails to develop, as a result one side of the heart pump the blood to the lungs and the body, this problem is called	Hypoplasia
1776.	When heart valves, arteries or veins are abnormally narrow or blocked	Obstruction defects occurs
1777.	Common obstruction defect includes blockage of pulmonary valve, aortic valve	and bicuspid aortic valve
1778.	Any blockage or narrowing can cause heart enlargement or	Hypertension
1779.	The most common among the congenital heart defect are the defect in the	Septa of the heart
1780.	Septal defect may or may not cause cyanosis depending upon the	Severity of the defect
1781.	**BLUE BABY OR CYANOSS**	
1782.	Birth of blue babies, a physiological condition called	Cyanosis
1783.	The reason for the appearance of the blue colour is due to carboxyhaemoglobin instead of	Oxyhaemoglobin **ETEA-2017**

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1784.	During the embryonic life, heart of the foetus start beating after	Four month of gestation
1785.	In heart of the foetus the valve which connect right atrium to the left atrium is	Foramen ovale **ETEA-2015**
1786.	HYPERTENSION	
1787.	Chronic medical condition in which person suffers persistently from high blood pressure is termed as	Hypertension
1788.	The normal blood pressure of human being is	120/70 mm Hg
1789.	With increase of age the rate of blood pressure also	increases
1790.	For woman above 45 years a mercury reading for hypertension is	130/90 mm Hg
1791.	For normal man the limit as	140/95 mm Hg
1792.	**Types of hypertension:** 1. Essential or primary hypertension (no medical cause for it, 90-95%) 2. Secondary hypertension (as a result of another disorder)	
1793.	Certain medicine which can cause hypertension are	Ibuprofen & steroids
1794.	Sleep disturbance and pregnancy may also cause	Hypertension
1795.	Persistent hypertension is one of the risk factors for stroke, heart attack, heart failure and	Arterial aneurysm
1796.	A severely high pressures, defined as mean arterial pressures 50% or more above the average, a person can expect to live	No more than few years
1797.	Accelerated hypertension is associated with headache, somnolence, confusion	Nausea & vomiting
1798.	Retina are affected causing visual disturbance in	Hypertension
1799.	The first treating mild to moderate hypertension is weight reduction and	Regular aerobic exercise
1800.	Reducing dietary intake and table salts are effective in	Reducing hypertension
1801.	An increase in calcium increases the dietary potassium which counteract the effect of the sodium and act on kidney to increase	Blood pressure
1802.	Discontinuing use of tobacco and alcohol has been shown to lower the	Pressure blood pressure
1803.	Reducing stress and hypertension are also effective in controlling the	Hypertension
1804.	The opposite of hypertension is Hypotension, it is a physiological state rather than	A diseases
1805.	The abnormally low blood pressure is termed as	Hypotension
1806.	Not often but most hypotension are associated with a	Shock
1807.	The initial symptom of hypotension is	Dizziness
1808.	The most common cause of hypotension is Reduced	blood volume to body
1809.	Patients with hypotension also complain chest pain, shortness of breath, irregular heartbeat and	Headache
1810.	Angina pectoris or simply angina is a severe, radiating chest pain due to the lack of blood supply to the	Heart muscle
1811.	ANGINA PECTORIS HEART ATTACK AND HEART FAILURE	
1812.	Main cause of angina is	Atherosclerosis
1813.	Pain of angina starts from left side of the chest and radiate to Left shoulder,	neck & to cerebral region
1814.	The first alarm of body to show that something is going wrong with the heart is	Angina
1815.	TREATMENT OF CARDIOVASCULAR DISORDERS	

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1816.	**Treatment of cardiovascular disorders:** 1. Angiography(test) 2. Angioplasty(balloon –tip catheter) 3. Coronary bypass 4. Open heart surgery	
1817.	Angiogram is commonly used to check the condition of the	Blood vessels
1818.	Angioplasty is the combination of two Greek words: aggeios meaning vessel and platos which means	Formed or moulded
1819.	The balloon of catheter is inflated to a fixed size using water pressure some 75-500 times more than normal blood pressure which is	6-20 atmosphere
1820.	A metallic ring placed in artery to remain it open is called	Stent
1821.	A successful graft typically lasts around	10-15 years
1822.	Any surgery in which chest is opened and surgery is performed on the heart muscle, valves, arteries or other heart structures is termed as open	Heart surgery
1823.	In conventional heart surgery, the heart-lung machine also called cardiopulmonary bypass is used when	Heart is non functional
1824.	The reduction of the blood pressure by 5-6 mm Hg can decrease risk of stroke by	40%
1825.	The reduction of the blood pressure by 5-6 mm Hg can decrease risk of coronary heart disease by	15-20%
1826.	**History of coronary artery bypass:** The first artery coronary bypass surgery was pe formed in the united states on may 2,1960 at the Albert Einstein college of medicine,Bronx Municipal hospital center by a team led by Dr.Robert Goetz and the thoracic surgen, Dr.Michael Rohman with the assistant of Dr.Jordan haller and Dr. Ronald Dee. In 1967 Dr rene Favaloro introduced introduced a new techniquein which a saphenous vein(present in lower part of leg) was used to replace the block coronary artery	
1827.	The first scuccesful surgery of heart, performed without any complication was done by	Dr. Ludwig Rehn of Frankfurt
1828.	Some new surgical procedures in which heart is beating and surgery is performed are called	Beating heart surgery
1829.	LYMPHATIC SYSTEM	
1830.	A network of vessels present in vertebrate that carry a milky fluid called lymph	Lymphatic system
1831.	The lymphatic ducts was first discovered in 1652 by	Swedish Olous rudbeck (1602-1702)
1832.	In 1653 the Thomas Bartholin described that duct vessels are present in the	All body
1833.	Lymph vessels at certain points have masses of connective tissue called	Lymph nodes
1834.	**Lymph nodes:** • More than 100 in human • Are present in armpits, groin and neck region • Site of lymphocytes production and storage **ETEA-2012** • Filter out and destroy toxins and germs	
1835.	The largest body of lymphoid tissues in the human body is	Spleen

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1836. **The nodes are located in following six areas:**

Areas	Receive lymph from
The cervical region	Lower jaw, ear, deep in neck
The axillary region	Underarm, wall of thorax, breast, upper wall of abdomen
Inguinal region	Legs, outer portion of genitalia
The pelvic cavity	Pelvic cavity
Abdominal cavity	Intestine and abdominal aorta
Thoracic cavity	Between the lungs, along wind pipe and bronchi, internal wall of thorax

1837. Large lymphatic vessels generally called lymphatic trunks drain lymph from larger areas of the body, and they are named for the areas that they serve. E.g:

Vessels	Part
Intestinal trunk	Abdominal cavity
Lumbar trunk	legs and pelvic organ
Bronchomediastinal trunk or Intercostal trunk	Thorax
Subclavin trunk	Arms
Jugular trunk	Neck and head

1838.	The collecting ducts finally drain the lymph into the Subclavian veins to	Become part of plasma
1839.	The lymphatic system and cardiovascular system are jointed by	Capillary system
1840.	When the blood passes through arteries, veins and capillaries, water with some salts oozes out to the tissue space and this fluid is called	Interstitial fluid
1841.	The spleen contains lymphocytes and other kind of WBCs called	Macrophages
1842.	The lymphatic system is responsible for carrying cancerous cells between the various parts of the body in a process called	Metastasis
1843.	If intervening lymph node are not successful in destroying the cancerous cells the nodes become sites of the	Secondary tumors
1844.	Pressure on adjoining organs and nerve endings can result in a paralysis or	Dysfunction of vital organs
1845.	Digestion of carbohydrate is helped by	Ptyalin **ETEA-2012**
1846.	A coiled hemoglobin is called	Myoglobin **ETEA-2010**
1847.	Phage viruses are abundant in man intestine because their abundant	Bacteria are present **ETEA-2009**
1848.	Pancreatic juice contain	Amylases, Protease, Lipases
1849.	Amylase is only digestive enzyme which is secreted from pancreas in	Active form
1850.	Death occur if level of glucose in blood falls to	30
1851.	Lithotripsy is a technique used to remove kidney stone with out	Surgery
1852.	Goiter is caused by a deficiency of	Iodine in water
1853.	In human beings meiosis occurs in	Ovaries

Since 2016

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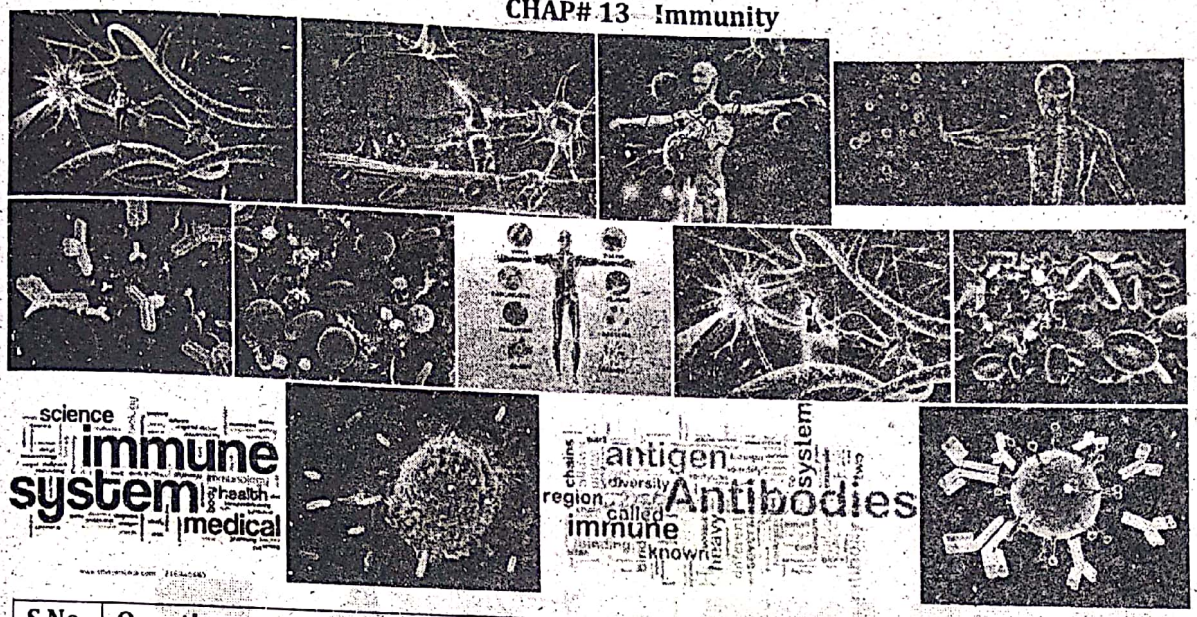
1854.	In human body bacteria are present in abundance in	Intestine
1855.	Hyper functioning of thyroid gland will cause	Weight loss
1856.	Control center of speech is present in	Cerebrum
1857.	Hodgkin's diseases is an *enlargement* of the lymph nodes in the	Neck
1858.	The foramen ovale in the fetal heart is located in the	Interatrial septum
1859.	Lymph is poured back to the circulatory system in	Subclavian vein

CHAP# 13 Immunity



S.No	Questions	Answers
1860.	INTODUCTION	
1861.	Antibodies are produced by the immune system in response to the presence of an	Antigen
1862.	large molecules usually proteins on surface of cells, virus, fungi, bacteria and some non-living substances such as toxin, chemicals and foreign particles are known as	Antigens
1863.	Study of our protection from macromolecules or invading organism and our response for them	Immunology
1864.	Immune response to our own proteins and other molecules are called	Autoimmunity
1865.	Immunity response against our own aberrant cells is called	Tumor immunity
1866.	FIRT LINE OF DEFENCE	
1867.	Skin, mucus membrane, HCl, cilia, mucus	Firt line of defence **ETEA-2016**
1868.	Macrophages, neutrophils, natural killer cells, the complementary system	Second line of defence **ETEA-2015**
1869.	The largest organ of integumentary system	Skin
1870.	Providing insulation, temperature regulation and sensation is done by	Skin
1871.	Our first line of defense in nonspecific and includes structures, chemicals & Process that prevent	Pathogens from entering
1872.	Skin, mucus membrane of respiratory, digestive, urinary and reproductive systems	First line of defense

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1873.	**PHYSICAL AND CHEMICAL COMPONEN OF SKIN DEFENCE**	
1874.	**Skin is comprised of two main layers:** 1. The epidermis • Composed of multiple layers of tightly packed cells • Contain epidermal dendritic cells that actively patrol the skin to phagocytize pathogens 2. The dermis • Contain protein fibers called collagen • Collagen is tough fibrous proteins which give strength and pliability to resist	
1875.	**CHEMICAL COMPOSITION OF SKIN DEFENCE**	
1876.	**Chemical components of skin defense:** 1. Perspiration • Secreted by the skin's sweat glands • It contain salt and enzyme • Lysozymes in sweat are enzyme that can destroy cell wall of bacteria 2. Sebum • Secreted by skins sebaceous(oil) gland • Lower the pH of the skin to more acidic	
1877.	The healthy stomach essentially remain	Sterile
1878.	Proper acidic level of the stomach prevent	Over growth from occurring
1879.	**FUNCTIONS OF CILIA AND MUCUS IN NOSE AND NASAL CAVITY:**	
1880.	**Functions of cilia and mucus in nose and nasal cavity:** • Filteration of bacteria, virus, duct, pollen • Traping of particles before they enter to body • Warming the air • Adding moisture to each breath to prevent air ways and lung from becoming dry and damaged	
1881.	Because the nose and nasal cavity are so effective at filtering, warming and moisturizing each breath so it is better to breath through nose rather than	Mouth
1882.	Oxygen may be easier for the lungs to extract from air that has entered by	Nose
1883.	Basal cell of nose are also called	Stem cell
1884.	Goblet cell secrete	Mucus ETEA-2012
1885.	To help the breathing process there is a own natural clearance method in	Lungs
1886.	Thin mucus is swept up towards the wind pipe by tiny breathing hairs called	Cilia
1887.	**SECOND LINE OF DEFENCE** **ROLE OF MACROPHAGES AND NEUTROPHYLLS**	
1888.	Second line of defense is nonspecific but it contains	Variety of microbes
1889.	Monocytes and neutrophils are two types of	WBCs
1890.	Monocytes are released by the	Bone marrow
1891.	Monocytes flow in the blood steam when enter to tissues it turn into	Macrophages
1892.	Of all blood cells, macrophages are	Biggest

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1893.	Most boundary tissues has its own macrophages for example, Alveolar macrophages live in the	lungs
1894.	Macrophages clean up pus as a part of the	Healing process
1895.	ROLE OF NATURAL KILLER CELLS	
1896.	The most common form of WBCs in the body are	Neutrophils
1897.	Bone marrow produces trillion of WBCs every day but their life span is	Less than a day ETEA-2012
1898.	Once in the blood steam neutrophils can move through	Capillary wall into tissues
1899.	If we get a splinter, neutrophils will be attached by a process called	Chemotaxis
1900.	Once neutrophil finds foreign particles it engulf it & destroy it by releasing	hydrogen peroxide
1901.	Natural killer cell are type of lymphocytes and a component of	Innate immune system
1902.	Natural killer(NK) cell play a vital role in host-rejection of both tumours and	Virally infected cells
1903.	Nk cells are cytotoxic, small granules in cytoplasm contain special proteins such as perforin and protease known as	Granzymes
1904.	In the cell membrane of target cell pores are formed by	Perforin
1905.	Granzymes and associated molecules enter through pores and cause	Apoptosis
1906.	When virus infected cell burst it releases the virions and is called	Cell lysis
1907.	When virus cell burst inside the cell, it is called	Apoptosis
1908.	COMPLEMENTARY SYSTEM	
1909.	The complement system includes proteins and white blood cells which	Carry antibodies
1910.	The white blood cells and proteins work together to coat any invading bacteria with antigen which often make the bacteria incapable of reproducing or bind the bacterium to a toxic chemical	To make it break apart
1911.	The cell in the blood that detect the pathogenic bacteria and signal the complement system to get to work are	Macrophages
1912.	INTERFERON	
1913.	**There are three main types of interferon:** 1. Interferon alpha (produced by WBC and fibroblasts) 2. Interferon beta (produced by WBC and fibroblasts) 3. Interferon gamma (produced primarily by Activated T cells)	
1914.	Interferon are antiviral agent and can fight	Tumors ETEA-2018
1915.	Major histocompatibility complex class I and II, which display foreign peptides for	Activation of T cells
1916.	INFLAMMATOR RESPOSE AS ONE OF THE NNON SPECIFIC DEFENCES	
1917.	When tissues are injured by bacteria, trauma, toxin, heat or any other cause	Inflammation occurs
1918.	In inflammation the damaged tissue releases chemicals including histamine, bradykinn and	Serotonin
1919.	The chemicals from injured tissues cause blood vessels to leak fluid into the tissue causing	Swelling

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1920.	Pus is formed from a collection of dead tissue, dead bacteria, and live and	Dead phagocytes
1921.	**The main symptoms of inflammatory response are:** 1. Heat 2. Pain 3. Redness 4. Inflammation 5. Loss of function	
1922.	The inflammation process continues until the infection that cause it has bees	Eradicated
1923.	PYREXIA AND PYROGENS	
1924.	The elevation of body temperature above the normal range is called	Pyrexia (fever)
1925.	Pyrexia may cause by abnormality in the brain or by	Toxis substances
1926.	The temperature of body is regulated normally by	Nervous feedback mechanisms
1927.	The temperature regulating center is located in the	Hypothalamus at brain
1928.	Substance which may cause "set point" of the hypothalamus thermostat to rise is called	Pyrogens
1929.	A pyrogens may be break down products of protein, lipololysaccharides toxins(LPS or endotoxin) secreted by bacteria and can act as	Pyrogens
1930.	Pyrogen if injected to animal, it can cause fever if they are as little as	Few nanogram (one-billionth)
1931.	Pyrogens are produced by many microorganism including bacteria,	Yeast and moulds
1932.	The body's natural way of depending itself is	Fever
1933.	The normal temperature of human is	37.8° C (100 °F)
1934.	**Benefits of fever:** 1. More WBCs produced 2. More interferon produced 3. Walling of iron on which bacteria feed on 4. Increase temperature	
1935.	THIRD LINE OF DEFENCE	
1936.	Monocytes develop from stem cells in the	Bone marrow
1937.	In tissues, monocytes further mature into	Macrophages
1938.	Lymphocytes are one of the five kinds of	WBCs
1939.	The most abundant lymphocytes are	B cells & T cells
1940.	B cells are produced in	Bone marrow
1941.	T cells are produced in Bone marrow but mature in	Thymus
1942.	Each B & T cell is specific for specific	Antigen
1943.	BASIC TYPES OF IMMUNITY	
1944.	**There are two types of immunity:** 1. Innate or inborn or natural immunity(skin, hairs, cilia, mucus, HCl, WBCs, macrophages) 2. Acquired or adaptive immunity a. Active or natural immunity → Long lasting immunity b. Passive or artificial immunity → For a short time	

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1945.	The innate immunity is inherited from mother to offspring through	Placenta **ETEA-2019**
1946.	**The acquired immunity may be** 1. Temporary such as influenza 2. Permanent such as measles, mumps, polio, small pox for long life	
1947.	**Active immunity is developed by three ways:** 1. By disease (chicken pox, mumps, measles) 2. By subclinical infection (**live** "sabin" vaccine against polio) 3. By killed microorganisms (**killed** "salk" vaccine against polio)	
1948.	Passive immunity is "borrowed" from	Another source
1949.	Antibodies in a mother's breast milk provide a baby with temporary immunity which is	Passive immunity **ETEA-2015**
1950.	VACCINATION	
1951.	Body is made vaccine or resistant to infection diseases, typically by the administration of a vaccine is called	Immunization
1952.	The word vaccination or vaccine had been evolved from "vacca" which means cowpus, which contain	Virus for cowpox
1953.	The cowpox and small fox virus are very similar	In structure
1954.	If human body is exposed to cowpox virus, the body acquired immunization	Against smallpox
1955.	Immune-biological substances which produce specific protein against a given disease is definition of	Vaccine
1956.	Vaccine may be prepared from live modified organisms, inactivated or killed organisms, extracted cellular fractions toxoids or	Combination of these
1957.	SPECIFIC DEFENCE MECHANISM	
1958.	**Specific defense mechanism are effective against pathogens, there are two main types of specific defense mechanism:** 1. Cell mediated immune response → consist of T-cells **ETEA-2012** 2. The antibody mediated immune response → consist of B-cells	
1959.	**T cell are of three types:** 1. Cytotoxic T cells which directly kill invaders 2. Helper T cells which aid B and other T cells to do their jobs 3. Suppressor T cells which suppress the activity of B and T cells	
1960.	**The cellular immune response occur in two phases:** 1. Activation phase → repeatedly division occur 2. Effector phase → killing the target cell	
1961.	The humeral immune system consist of	B cells
1962.	B cell can produce antibodies but they need exposure to the	antigens to do so **NMDCAT-2020**
1963.	Antigens are cell surface oligosaccharides & proteins which the cell uses as	ID tags
1964.	Antibodies are chemically proteins found in the	Blood plasma & lymph
1965.	All B daughter cell will able to produce same antibodies as the	Mother cell produced
1966.	Antibodies bind to certain parts of an antigen to mark it for destruction by	T cells
1967.	Some B cell become memory cell ready to respond to a later	Plasma cells

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	invasion by the same pathogens but most become antibody' producing factories called	
1968.	Antibodies are immune system-regulated proteins called	Immunoglobulins
1969.	STRUCTURAL OF MODEL OF ANTIBODIES	
1970.	Each antibody consist of four polypeptide chains	2 heavy & 2 light
1971.	The amino acid sequence at the tip of "Y" varies greatly among	Different antibodies
1972.	The variable region of antibody is composed of	110-130 amino acids
1973.	The variable region includes the end of	Light and heavy chain
1974.	**Classes of antibodies:** 1. IgG 2. IgA 3. IgM 4. IgE 5. IgD (gamed)	
1975.	ALLERGIES	
1976.	The abnormal reaction to the ordinarily harmless substances is called	Allergies
1977.	**The chance of allergies if:** • Neither parents are allergic → 15% • One parent are allergic → 30% • Both parents are allergic → 60%	
1978.	During the sensitization period in allergy,	IgE is overproduced ETEA-2017
1979.	Allergic shock are also called	Anaphylaxis shock or Anaphylactic shock
1980.	**Allergens that most frequently cause problems are :** Pollens, mold spores, house dust mites, animal danders, foods, insect bites or stings, plant insect spores, latex, virus, bacteria, medications and Environmental conditions such as cold temperature	
1981.	AUTOIMMUNE DISORDERS	
1982.	When body produce an inappropriate immune response against its own tissues is called	Autoimmune disorder
1983.	**Some of the auto immune disorders are:** NMDCAT-2020 • Lupus • Juvenile rheumatoid arthritis • Juvenile dermatomyositis • Ankylosing spondylitis • Scleroderma	
1984.	MIX	
1985.	Of all blood cells, Macrophages are	Biggest
1986.	Macrophages lives in lungs are called	Alveolar macrophages
1987.	Perforin and proteases are known as	Granzymes

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1988. There are three types of interferon are:

S.No	Type	Produced By
1	Alpha (α)	White Blood Cells and fibroblast
2	Beta (β)	White Blood Cells and fbroblasts
3	Gamma (γ)	Act vated T cells

1989.	Vaccine used against polio is	Sabin
1990.	Vaccine used against tetanus	Tetanus toxoid
1991.	Helper T-Cells releases enzymes which go into	Rapid Reproduction
1992.	After reproduction B-cell forms two types of cells	Memory cells & Plasma cells
1993.	Irish potato famine was caused by *Phytopythora infestans* in	1845-1847
1994.	Oomycota (water molds) reproduce sexually as	Oogamous
1995.	The ability of switching from heterotrophic to autotrophic is present in	Euglena
1996.	Fungi cell wall is made of	Chitin
1997.	Fungi are not true multicellular and they are heterotrophic	Eukaryotes
1998.	Antibodies are released by	B cells NMDCAT-2020
1999.	Antibodies are produced by	B-lympocytes
2000.	Blood cells are produced by	Bone Marrow
2001.	Memory cells of the immune system are deried from	B lymphocytes
2002.	B cells can be stimulated and suppressed by	T cells
2003.	Humeral immunity is due to	B lymphocytes
2004.	Hypersensitivity to an allerden is due to	Abberant functioning of immune system

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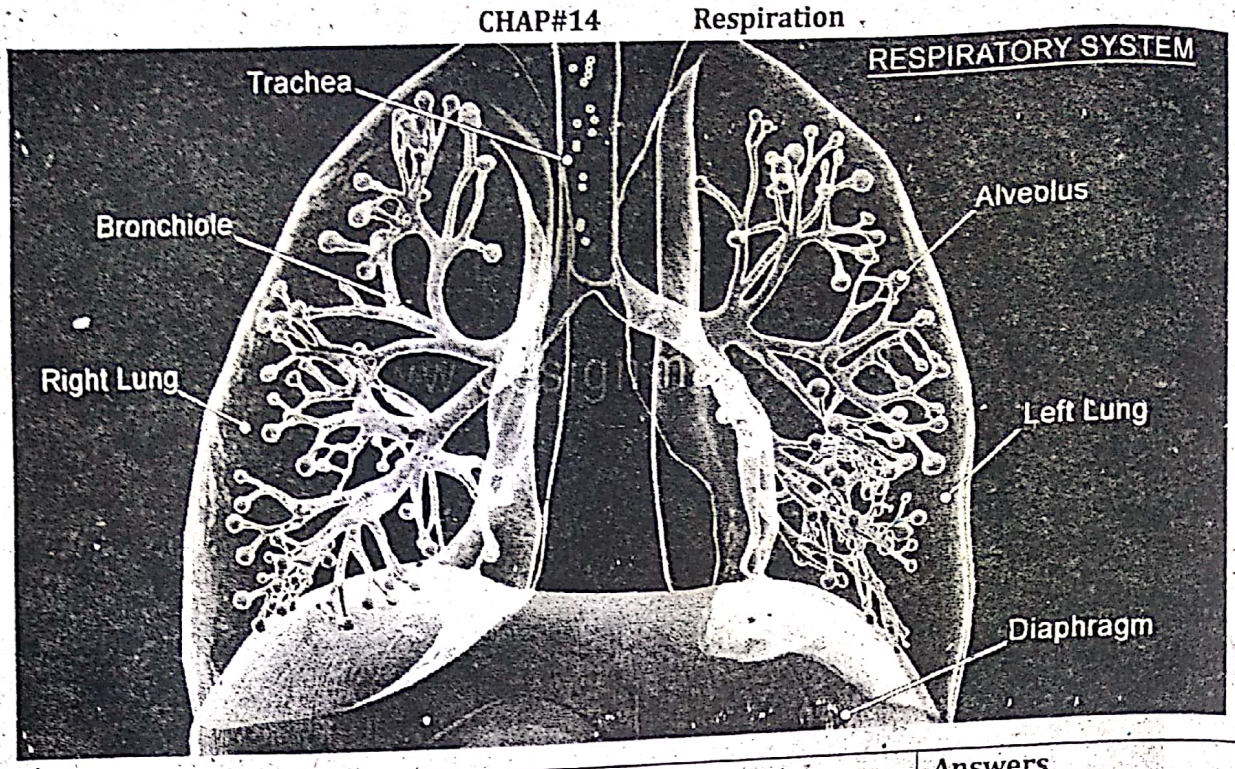
CHAP#14 Respiration



S.No	Questions	Answers
2005.	Of all blood cells, Macrophages are	Biggest
2006.	**Human respiratory System**	
2007.	Diffusion is only effective over distance of	1mm or less
2008.	The only externally visible part of respiratory system is	Nose
2009.	The structure of human nose is composed of bone, cartilage and	Fibro fatty tissues
2010.	The external features of bones depends upon the ethmoid bone and	Cartilage
2011.	Hairs are present inside	Nostrils
2012.	The mucus membrane secretes a sticky substance called	Mucus
2013.	For their removal the cilia move the trapped substance to the	Pharynx
2014.	Blood capillaries helps to warm the blood to a temperature of	30° C
2015.	Nose, Nasal cavity, Pharynx, larynx, trachea, bronchi, bronchioles and	Alveoli **ETEA-2012**
2016.	The shape of pharynx is	Cone shaped
2017.	Pharynx leads from oral and nasal cavities to the	Oesophagus and larynx
2018.	The part of both respiratory and digestive system is	Pharynx
2019.	Food is allowed to pass to the oesophagus through the	Nasal cavity in pipe
2020.	Function of larynx is air canal and	Organ of voice
2021.	Two fibrous bands called vocal cords are present in the	Larynx
2022.	Vocal cords are composed of mucus membrane stretched horizontally	Across the larynx
2023.	The length of trachea is	10 – 12 cm
2024.	The width of trachea is	2cm
2025.	The wall of trachea is composed of horse shoe shaped rings, their no is	16 – 20
2026.	Trachea protects the respiratory system from an accumulation of	Foreign particles
2027.	Adults male have larger vocal cords and have	Low pitched voice

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2028.	Adults woman have smaller vocal cords and have	High pitched voice
2029.	the right bronchus has a larger diameter and shorter than the	Left bronchus
2030.	The diameter of bronchiole is	1 mm or less
2031.	The walls of bronchiole consist of ciliated cuboidal epithelium and a	Layer of smooth muscles
2032.	The first airway branch which do not contain cartilage is	Bronchioles ETEA-2016
2033.	The air distribution in lungs is controlled by	Bronchioles
2034.	The actual exchange of oxygen and carbon dioxide occurs in	Alveoli
2035.	The thickness of wall of alveolus is	0.1 μ m
2036.	Alveoli contain collagen and	Elastic fibres
2037.	The volume of right lung by percentage is	56%
2038.	The volume of left lung in total lung volume is	44%
2039.	The right lung is composed of three lobes	Superior, middle and inferior
2040.	The left lung has only	Two lobes (sup-inf)
2041.	The two lung rest their bases with diaphragm and their apexes extends	Above the first rib
2042.	Special cells in alveolus secrete a detergent like chemical on inside lining of alveolus called	Surfactant
2043.	Each lung is encased in a thin membranous sac called	Pleura
2044.	**Lung volume and capacity**	
2045.	**Volume of lungs:**	

Normal volume	5 L
Tidal volume	0.5 L
Residual volume	1.5 L

2046.	The average adult human has a lung capacity of approximately	5 liters
2047.	The volume of air exchanged during one breath in and out in quite breathing and this is about	Tidal volume
2048.	The volume of air remaining in the lungs even after a forcible expiration and this is about	Residual volume
2049.	**Control of breathing**	
2050.	Involuntary control of breathing is carried out by a breathing center	In medulla oblongata
2051.	The ventral portion of breathing center act to increase the rate and depth of inspiration and is called	Inspiratory centre
2052.	The dorsal and lateral portion inhibits inspiration and stimulate expiration and form the	Expiratory centre ETEA-2018
2053.	The breathing center communicates with intercostal muscles by	Intercostal nerves
2054.	The breathing center communicates with diaphragm muscles by	Phrenic nerves
2055.	Inspiration is in	Active process
2056.	Expiration is an	Passive process
2057.	The lungs are made to expand and contract by movements of the	Ribs and Diaphragm
2058.	The shape of diaphragm in inspiration is	Flattened
2059.	The shape of diaphragm in expiration is	Dome
2060.	During voluntary control impulses originate from the cerebral	Breathing center

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	hemispheres and pass to the	
2061.	**Mechanism of transport of gases**	
2062.	20% decrease in oxygen concentration in the air produce	Doubling in breathing rate
2063.	**Transport of oxygen in blood:** **ETEA-2015**	

As oxyhaemoglobin	97 %
As plasma	3%

2064.	Oxygen binds with haemoglobin in presence of enzyme called	Carbonic anhydrase
2065.	To form oxyhaemoglobin, each haemoglobin binds with	Four oxygen of molecules

2066. **Respiratory pigment in invertebrates**

Pigment	Invertebrates	Oxygenated pigment colour	Deoxygenated pigment colour
Haemoglobin	Human	Bright red	Dark red
Haemocyanin	Mulluskus	Blue	Colourless
Haemoerythrin	Some marine animals	Violet to pink	Colourless
Chlorocruorin	Annelids	Green	colourless

2067.	Amount of haemoglobin in blood is	15 gms / 100 ml
2068.	1 gm haemoglobin combines with	1.34 ml of oxygen

2069. **ETEA-2014**

Oxygen in	Capacity	Pressure of PO_2	Saturation
Arterial blood (maximum)	20 ml /100 ml	100 mm Hg	100 %
Arterial blood (normal)	19.4 ml/100 ml	95 mm Hg	97 %
Venous blood (normal)	14.4 ml/100 ml	40 mm Hg	75 %

2070.	The amount of oxygen released to tissues by each 100ml blood is	5ml of oxygen **ETEA-2017**
2071.	During exercise venous blood that leave an active tissues has 4.4 ml	At 18 mm Hg (20% sat)
2072.	In dissolved form 100 ml of artery blood contain 0.29 ml O_2 (95 mmHg) and increase to	0.3ml/100ml at 100 mmHg
2073.	In plasma in dissolved form 100 ml of venous blood contain 0.12 ml of dissolved oxygen at	40 mmHg
2074.	The oxygen transported to tissues per cycle in dissolved state is	0.17 ml of oxygen
2075.	Haemoglobin is bright red when	Oxygenated
2076.	Haemoglobin is dark red when	Deoxygenated

2077. Carbon dioxide is carried in the blood **ETEA-2016**

As	%age
Bicarbonate ions	70 %
Carboxyhaemoglobin	23 %
Plasma	7 %

2078.	Otistis media is of two types otitis externa and	Otitis media
2079.	Otitis media is due to formation of	Cholestrenata **ETEA-2017**
2080.	CO_2 combines with H_2O to form carbonic acid(H_2CO_3) in presence	Enzyme Carbonic

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	of	anhydrase
2081.	From inside erythrocytes diffuses $H_2CO_3^-$ into plasma to form	Sodium bicarbonate
2082.	Diffusion of $H_2CO_3^-$ and Cl^- is balanced by	Bicarbonate-chloride carrier
2083.	The opposite movement of $H_2CO_3^-$ and Cl^- is called chloride-shifts or	Hamburger's phenomenon
2084.	**Respiratory pigments**	
2085.	CO_2 combines with globin part of	Haemoglobin ETEA-2012
2086.	Oxygen carrying capacity is increases by	Haemoglobin
2087.	Oxygen is stores in muscles in	Myoglobin
2088.	**Respiratory disorders**	
2089.	Sinusitis is an inflammation of	Nasal Sinusitis
2090.	Otitis media is an inflammation of	Middle ear ETEA-2017
2091.	Pneumonia is serious disorder of	Lower respiratory track
2092.	Acute symptoms of Sinusitis appear in	2 - 8 weeks
2093.	80% of otitis media clear up within	3 – 4 days
2094.	Sinusitis and Otitis media are caused by	Bacteria, allergy & infection
2095.	Treatment of Sinusitis is Antibiotics, antiallergic and	Decongestants
2096.	Treatment of otitis media is	Antibiotic and pain killer
2097.	There are four large sinuses 2 maxillary sinuses and	2 frontal sinuses
2098.	The pressure between the middle air cavity and outside mucus to drain out of the middle air cavity is equalized by	Eustachian tube
2099.	Fluid leaking of ear is called	Nausea
2100.	Device which is used to look into the ear is called	Otoscope or auriscope
2101.	Otoscope consist of light and	Low-power magnifying lens
2102.	There are about 30 different kinds of	Pneumonia
2103.	Usually pneumonia is caused by	Bacteria and virus
2104.	Streptococcus pneumonia, hemophilus influenza, legionella pneumophilia, ataphylococcus aureus and mycoplasma causes	Pneumonia
2105.	**Some complications may arise if pneumonia is not treated on time:**	

Complications	Name
Fluid around the lungs	Pleural effusion
pus in the pleural cavity	Empyema
low blood sodium	Hyponatremia
Accumulation of fluid	Abscess in the lung (rare)

2106.	In pneumonia body is unable to get proper amount of oxygen due to	Fluid in the air sacs
2107.	Tuberculosis is highly contagious chronic bacterial infection of	Lungs
2108.	TB infection begins when mycobacteria reach the alveoli, where they invade and replicate within the Phagosomes of alveolar	Macrophages
2109.	TB is caused by	Mycobacterium tuberculosis

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2110.	TB is transferred from person to person by	Airborne droplets
2111.	Most common drugs used for treatment of TB are	Isoniazid and rifampin
2112.	In a person with emphysema, the	Alveoli are damaged ETEA-2016
2113.	15% of TB of patient may develop the disease other than lungs, such as	Lymph nodes,GI track,bones and joints
2114.	10% of people having M.Tuberculosis ever develop	Pneumonia
2115.	Tubes which are inserted to ear are called	Grommerts / tympanostomy
2116.	The surgery in which hole is made in the ear drum is called	Myringotomy
2117.	Rapid breathing and rapid pulse rate are symptoms of	Bacterial pneumonia
2118.	Breathlessness and slow heart beat are symptoms of	Mycoplasma pneumonia

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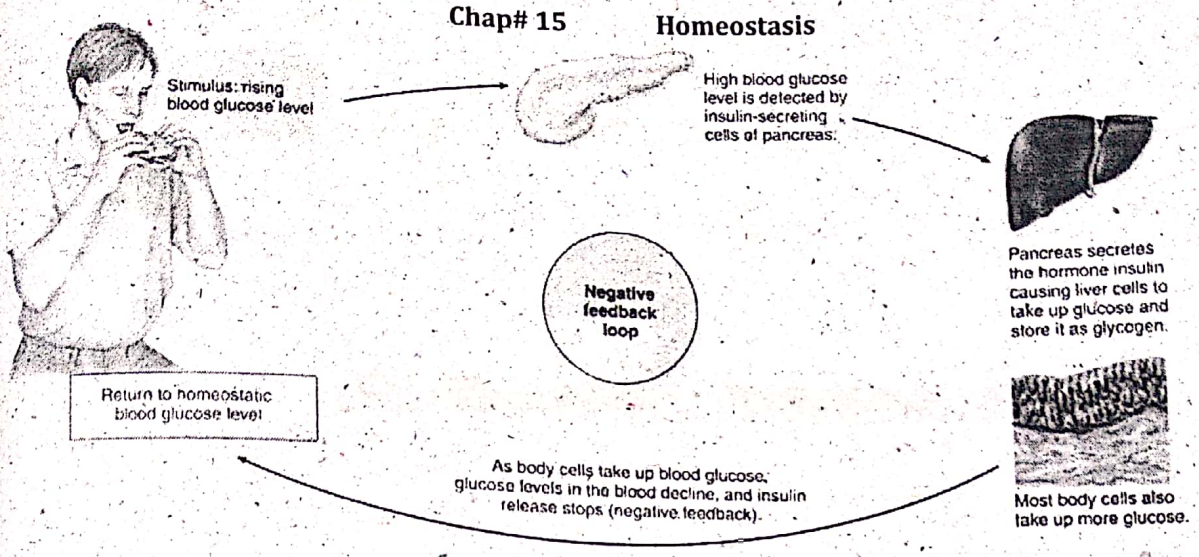
Chap# 15 Homeostasis



S.No	Questions	Answers
2119.	**Mechanism of homeostasis**	
2120.	The internal environment is formed by circulating organic liquid called	Lymph or Plasma
2121.	The tendency to regulate internal conditions are	Homeostasis
2122.	Hypothalamus in fore brain is a body	Thermostat **ETEA-2019**
2123.	Hypothalamus stimulates posterior pituitary lobe to release	Antidiuretic hormone (ADH)
2124.	Maintenance of water in body by ADH is an example of	Negative feedback
2125.	The part of nephrons which become permeable by secretion of ADH	Collecting tubules and distal convoluted tubule
2126.	The negative feedback mechanism results in a reversal of the	Direction of change
2127.	Positive feedback brings childbirth to	Completions
2128.	If a person breath high concentration of CO_2 the breathing rate of him	increases
2129.	**Osmoregulations**	
2130.	Electrolysis is used for both water and	Ions
2131.	The percentage of water in animals is	70%
2132.	Osmoregulators are animals which use energy in controlling	Water gain or loss
2133.	All land animals and some marine vertebrates are	Osmoregulators
2134.	Osmoconfermers live in sea and have same amount of solutes equal to	External environment
2135.	The animal body fluids of osmoconfermers are kept	Isotonic
2136.	Almost all of the fresh water animals are	Osmoregulators
2137.	The animals of osmoregulator to external environment are	hypertonic
2138.	In fresh water animals there is continual loss of	Body salts to surrounding
2139.	All fresh water has no need of	Drinking water
2140.	All fresh water animals produce large amount of urine and absorbs	Salts
2141.	Salt is obtained from food they eat in	Fresh water animals
2142.	Fresh water animals actively transport salts from external dilute environment through special salt cells called	Ionocytes

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2143.	Ionocytes are present in amphibian's skin and	Gills of fishes
2144.	Osmolarity of sea water is	1000 mos m/L
2145.	Osmolarity of blood of marine animals is	200-300 m/L
2146.	Marine animals excrete divalent ions like Mg^{++} and Ca^{++} through	Kidney **ETEA-2017**
2147.	Na^+, Cl^+ and K^+ are removed in marine animals by	Gill's epithelium
2148.	Some fishes have special salt secreting glands in the wall of rectum	Called rectal glands
2149.	The characteristic of special metabolic and behavioral adaptation of desert mammals is called	Anhydrobiosis
2150.	In anhydrobiosis animals 90% of water came from	Cellular oxidation
2151.	**Excretion**	
2152.	Most troublesome nitrogen containing wastes come from metabolism of protein and	Nucleic acid
2153.	The primary nitrogenous wastes product is	Ammonia (NH_3)
2154.	In ammonia, urea and uric acid the more toxic is	Ammonia (NH_3)
2155.	In ammonia, urea and uric acid the less toxic is	Uric acid **ETEA-2019**
2156.	In ammonia, urea and uric acid the more toxic is	ammonia
2157.	Birds secretes	Uric acid **ETEA-2016**
2158.	Shark secretes	urea

2159. **Into nontoxic form, amount of water requires to dissolve 1g of:**

Substance	Water amount
NH_3	500 ml
Urea	50 ml
Uric acid	1 ml

2160.	Urea is 1 lac time less toxic than	Ammonia (NH_3)

2161.

Secretion	Called	Example
Ammonia	Ammonotelic	fishes, protozoa, sponges
Urea	Ureotelic	some marine and all terrestrial
Uric acid	Uricotelics	terrestrial invertebrates and egg lying vertebrates

2162.	The vertebrates that lay shelled eggs excrete	Uric acid
2163.	**Human excretory system**	
2164.	Skin. Lungs, Liver and kidney are organs of	Excretory system
2165.	The length, width and thickness of kidney is	12cm 6cm 4cm
2166.	The weight of stomach is about	150 gms **ETEA-2016**
2167.	Kidney is placed between last thoracic vertebra and	Third lumbar vertebra
2168.	The upper part of kidney is protected by	Eleventh and twelfth rib
2169.	The right kidney is..... from left kidney	Lower
2170.	The deep notch of inner surface of kidney is called	Hilus
2171.	The tough double membrane around the kidney is called	Renal peritoneum
2172.	The blood received by kidney from heart is	20%
2173.	The rate of blood flow through kidney is	1.2 liter per minute
2174.	Cortex contain renal corpuscles and	Convoluted tubules

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2175.	The medulla contain conical structures called	Pyramids
2176.	Kidney length	12 cm
2177.	Ureter length	28 cm
2178.	Urethra (female) length	2-3 cm
2179.	Urethra (Male) length	20 cm
2180.	The storage of urinary bladder is	0.5 to 1 liter ETEA-2017
2181.	Lower part of urinary bladder is guarded by	2 sphincters
2182.	The act of emptying the bladder is called	Micturition
2183.	Urethra in females carry	Only urine
2184.	Urethra in male carry	Urine and spermatic fluid
2185.	Urethra in female open externally by	Urethral orifice
2186.	Urethra in male open externally by	Urinogenital aperture
2187.	Each human kidney contain	1 million nephrons ETEA-2017
2188.	2 kidney or human contain	**2 million nephrons**
2189.	Glomerulus receives blood from	Afferent arteriole
2190.	Glomerulus sent blood to	Efferent arteriole
2191.	Cells of bowman capsule wrap around glomerulus capillary is called	Podocytes
2192.	The membrane which stops getting protein is	Basement membrane
2193.	Proximal convoluted tubule, loop of Henle, distal convoluted tubule and collecting duct are	Renal tubules
2194.	The longest part of nephron is	Proximal convoluted tubule
2195.	The loop of Henle is more prominent in	Juxtamedullary nephrons
2196.	Loop of Henle descends down to the tips of	Pyramids in medulla
2197.	**Two general classes of nephron are:** • Cortical → 70% - 80% ETEA-2016 • Juxtamedullary →20% -30%	
2198.	Cortical nephron have short	Loop of Henle
2199.	Under normal condition the cortical nephron deals with control of	Blood volume
2200.	Juxtamedullary nephron have long loop of Henle which go deep into	Medulla
2201.	In kidney more amount of work is done by	Juxtamedullary
2202.	The capillaries of vasa recta runs antiparallel to the loops of Henle and	Collecting duct in medulla
2203.	Ultrafiltration, selective reabsorption and tubular secretion are	Process for urine formation
2204.	The diameter of efferent to afferent arteriole is	Half
2205.	About **20%** of plasma is filtered into	Bowman's capsule ETEA-2015
2206.	The filtered fluid into bowman's capsule is called	Glomerular filtrate
2207.	The amount of glomerular filtrate per minute is	125ml
2208.	The amount of glomerular filtrate per day is	180 liters
2209.	The amount of reabsorption from nephron out of 125ml is	124 ml
2210.	Over **80%** of glomerular filtrate is reabsorbed in	Proximal convoluted tubule

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2211.	The function of loop of Henle is to	Conserve water
2212.	The ascending limb is impermeable to	Water
2213.	The descending limb is highly permeable to	Water
2214.	The system which result in reabsorption of a lot of water is	Counter-current multiplier
2215.	The distal convoluted tubules control blood PH by secreting	Hydrogen ions
2216.	ADH open water channels in collecting duct to allow water to	Move out of the filtrate
2217.	Tubular secretion is the transfer of materials from peritubular capillaries	To renal tubular lumen
2218.	Tubular secretion is mainly caused by	Active transport
2219.	Most important substances secreted by the tubules are	H ions, K ions & organic ions
2220.	Many drugs are eliminated by	Tubular secretion
2221.	Water is loss by body in many ways such as evaporation, sweating,	Egestion and urine
2222.	The solute potential is primarily achieved by the effect of	Antidiuretic hormone (ADH)
2223.	ADH is secreted by the posterior lobe of	Pituitary gland
2224.	The hormone which increases the permeability of distal convoluted tubules and collecting duct is	Antidiuretic hormone (ADH)
2225.	When more water is absorbed from urine it make urine	Concentrated
2226.	When less water is absorbed from urine it make urine	Dilute
2227.	The maintenance of sodium level at a steady state is controlled by the	Steroid hormone aldosterone **NMDCAT-2020**
2228.	Steroid hormone aldosterone is secreted by	Adrenal cortex
2229.	Aldosterone activates sodium potassium pumps in the	Distal convoluted tubule
2230.	**URINARY TRACK INFECTION**	
2231.	All parts of urinary track is infected except	Ureters
2232.	**Infection in digestive tube and their names:**	

Organ	Infection
Kidney	Pyelonephritis
Bladder	Cystitis
Urethra	Urethritis

2233.	*Escherichia coli, Staphylococcus saphrophyticus, Klebisella, Entrococci bacteria, and proteus merabilis.Candida albicans* (fungus)	Bacteria which causes urinary tract infections(UTIs)
2234.	*Candida albicans* (fungus) cause infection in mouth,digestive tract and	Vagine and UTIs
2235.	**URINARY STONES**	
2236.	Urinary stones causes pain when enter from kidney to the	Bladder
2237.	Symptoms of urinary stones are pain in side belly/groin and colour of	Urine is penkish/reddish
2238.	Kidney stone forms when there is decrease in	Urine volume
2239.	Kidney stone forms when there is excess of stone forming substance	In urine
2240.	Percentage of types of stones of stone formation:	

Stone type	% age
Calcium with oxalate/phosphate	70 %

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	Struvite or infection stone	20 %	
	uric acid stones	5-10 % ETEA-2016	
	amino acid cysteine stones	1-3 %	

2241.	Kidney stones also results from Infection is urinary tract; known as	Struvite / infection stone
2242.	Hypercalcemia, Hyperoxaluria and Hyperuricemia are risk factors for	Developing kidney stones
2243.	The over secretion of parathormone from parathyroid gland	Hyperparathyroidism
2244.		

Disease	Increase level of	Place or target
Hypercalcemia	Calcium	Blood
Hypercalceuria	Calcium	Urine
Hyperoxaluria	Oxalate	Urine
Hyperuricemia	Uric Acid	Blood

2245.	Oxalates are present in tomato and other	Green leafy vegetables
2246.	The level of uric acid may arise from gout(genetic disorder) or due to	High protein intake (meat)
2247.	The stone which can passes from kidney is under	0.5 cm
2248.	The stone which cannot pass from kidney have greater than	1 cm
2249.	Extracorporeal shock waves lithotripsy(ECWL) is used for	Small stones
2250.	Percutaneous nephrolithotrypsy(PCNL) is used for	Large stones
2251.	The type of waves of Extracorporeal shock waves lithotripsy(ECWL) are Sound waves while that of PCNL is	Electromagnetic
2252.	Surgery is used for branched stones which are commonly known as	staghorn
2253.	**KIDNEY FAILURE**	
2254.	Acute kidney failure can be	reversible
2255.	Chronic renal failure cannot be	Reversible
2256.	Blood clot or cholesterol deposition of kidney artery , drugs , antibiotics, toxin such as alcohol ,heavy metals and cocaine can lead to	Acute kidney failure
2257.	Mostly diabetes and hypertension and anti-inflammatory drugs and analgesic medications (pain relievers) can leads to	Chronic renal failure
2258.	Chronic renal failure can progress to end stage renal disease(ESRD) and	Uremia
2259.	Diabetes modification such as reduced sodium, protein & fluid intake allow people to live for years with	Chronic renal failure
2260.	**RENAL DIALYSIS**	
2261.	Procedure to filter toxins from blood when kidney is unable to perform its function Is called	Renal dialysis
2262.	In theory renal dialysis can sustain life	Indefinitely
2263.	The two stages of peritoneal dialyses are the exchange and	The Dwell(time)
2264.	The primary advantage of peritoneal dialyses are	mobility
2265.	**KIDNEY TRANSPLANT**	
2266.	Replacement of diseased, damaged or missing kidney by donor kidney Is called	Renal transplant
2267.	First successful kidney transplantation took place between two twins in	1954 ETEA-2016

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2268.	The recipient of transplant kidney can expect to live for	5-20 years
2269.	The 1983 the risk of kidney rejection was high before the discovery of	Immunosuppressive drug cyclosporine
2270.	Transplant surgeon like to see HLAs matching of	3 or more HLAs
2271.	Donor-Recipient match of kidney must have same blood group and	Same HLAs
2272.	The number of Human Leucocyte Antigens(HLAs) in humans are	6
2273.	The antibody response of donor blood with recipient is called	Negative cross match
2274.	The risk of transplantation kidney include bleeding and	Postoperative infection
2275.	**THERMOREGULATIONS**	
2276.	The maintenance of body temperature by living organism is termed as	Thermoregulation
2277.	Temperature affect the geographical distribution of	Animals
2278.	On basis of maintaining the body temperature types of animals are	2(poikilotherm+homeotherm)
2279.	Animals which unable to maintain internal body temperature are	Poikilotherms (Ectotherms)
2280.	Animals which are able to maintain internal body temperature are	Homeotherms (Endotherms)
2281.	Invertebrates, fishes, amphibians and reptiles are	Poikilotherms **ETEA-2015**
2282.	Birds, white shark, flying insects, polar bear and mammals are	Homeotherms **ETEA-2015**
2283.	Animals gain heat from two sources the chemical reactions and	Radiant energy from sun
2284.	The animals which depends on external source for heat are	Poikilotherms
2285.	Animals which rely on heat derived from environment than metabolic heat to raise their temperature are called	Ectotherms
2286.	The temperature of structures below the skin and subcutaneous tissue	**36.4 – 37.3 ^{0} C**
2287.	The process of heat production in animals are called	Thermogenesis
2288.	Thermogenesis is regulated by nervous system and	Hormone
2289.	Shivering and non-shivering are two types of	Thermogenesis
2290.	Shivering response in muscles can increase heat production by up to	5 times the basal level
2291.	The short term metabolic activity is increased by	Adrenaline
2292.	The long term metabolic activity is increased by	Thyroxin
2293.	Heat is lost from body in process like conduction, convection and	Radiation (50%),
2294.	Heat loss occurs by evaporation from skin and from	Lungs
2295.	The erected hairs in human produces	Goose-pimples/ goose bumps **ETEA-2018**
2296.	Smooth muscle which erect human hair present at base of hair is called	Follicle
2297.	An increase in core temperature is known is	Fever or pyrexia
2298.	Antipyretic drug such as aspirin and paracetamol lower the set point and give relief but they slow down the normal	Defence mechanism **ETEA-2018**

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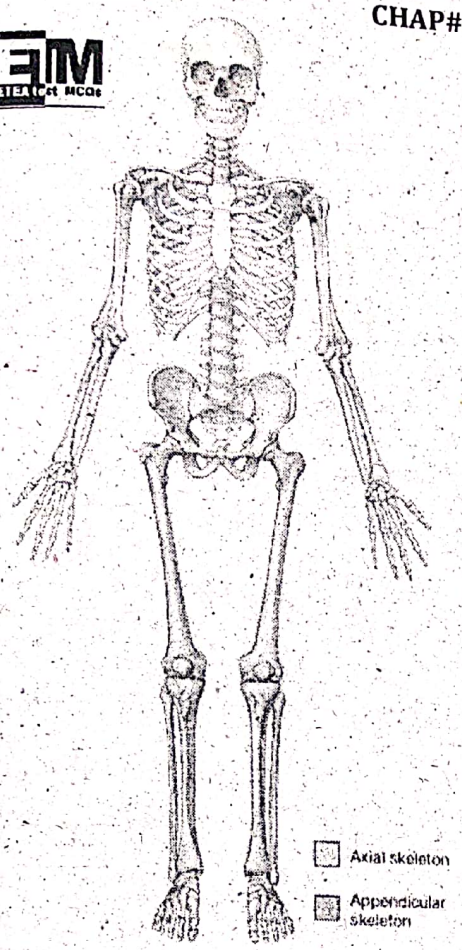
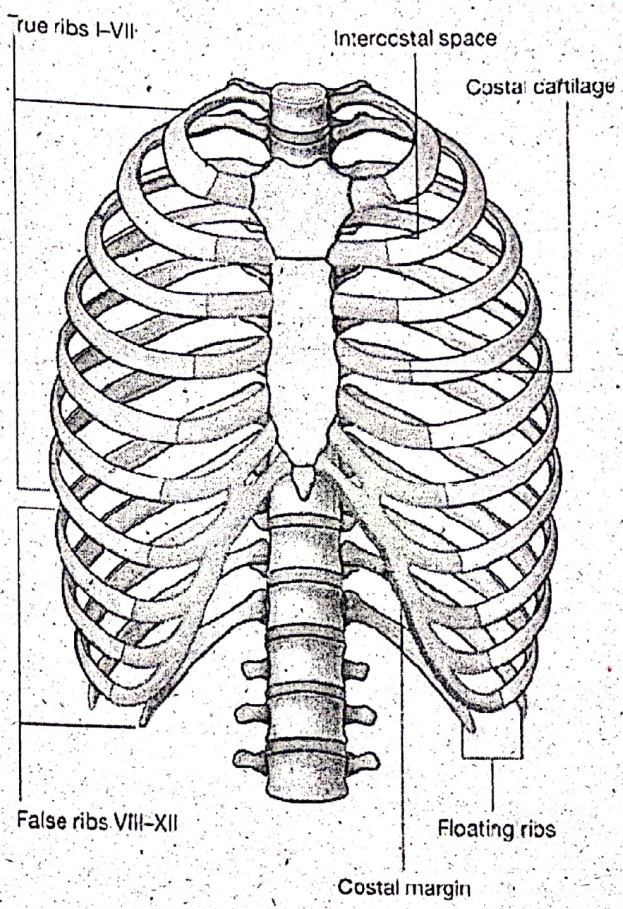
CHAP# 16 Support and movment





S.No	Questions	Answers
2299.	**HUMAN SKELETON**	
2300.	Living organisms are increased in size through a process called	Evolution
2301.	Cartilage contain tough, flexible, matrix made of type II collagen and	Cells called chondrocytes **ETEA-2014**
2302.	Chondrocytes are supplied by	Diffusion
2303.	Cartilage do not contain any	Blood vessels
2304.	The healing effect of cartilage from bone is	Slow
2305.	Human skeleton is initially made of cartilage and	Fibrous membranes
2306.	Three types of cartilage tissues in human are Hyaline, elastic and	Fibrocartilage
2307.	In human bone cells the matrix consist of 65% inorganic matter like Calcium, potassium and carbonate and 35 % of organic matter such as	Protein and collagen
2308.	Human bones are composed of three types Cells Osteoblast, Osteoclast and	Osteocytes
2309.	Osteoblast are mononucleated while osteoclast are	Multinucleated
2310.	Osteoblasts are immature while osteocytes are	Matured bone cells **ETEA-2016**
2311.	Osteoblast produce a matrix which is mainly composed of	**Type I collagen**
2312.	Osteoblast when entrapped by bone matrix they become	Osteocytes
2313.	Osteoblasts are responsible for	Mineralization

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2314.	Osteocytes meets with osteoblast for purpose of	Communication
2315.	The process in which osteoclast remove bone tissues and breaking up the organic matter is called	Bone resorption **ETEA-2014**
2316.	The composition of **organic material** in matrix in in bone cells	**30%**
2317.	The composition of **inorganic material** in matrix in in bone cells	**70%**
2318.	Matrix is composed of collagen fibers (90%) and	Glycoproteins **(10%)**
2319.	The chief constituent of inorganic is needle like crystals of	Hydroxyapatite
2320.	Hydroxyapatite is form of	Calcium phosphate
2321.	Calcium and phosphate is released to blood by control of 2 hormones	Parathormone & calcitonin **ETEA-2015**
2322.	Inorganic material present in bone are Na, Mg, K , chloride, fluoride	Bicarbonate and citrate ions
2323.	Mature cells of bone are	Osteocytes
2324.	Mature cells of cartilage are	Chondrocytes
2325.	Bone matrix contain	Type I collagen
2326.	Cartilages mostly contain	Type II collagen **ETEA-2012**
2327.	The number of bones in babies are	**350**
2328.	The number of bones in adult stage are	**206**
2329.	Axial skeleton consist of skull, vertebrae and	Ribs
2330.	Appendicular skeleton consist of pectoral girdle with forelimbs and	Pelvic girdle with hind limbs
2331.	The number of bones in skull	**22**
2332.	The number of vertebrae in human	**33**
2333.	The coccyx is man's vestige of a	Tail
2334.	Ribs encloses heart and	Lungs
2335.	The sites where two bones meet are called joints or	Articulations
2336.	Function of joints are to hold the skeleton and to give	mobility
2337.	The types of joints are fibrous, cartilaginous and	Synovial joints
2338.	Joint cavity is absent in fibrous and cartilaginous joints and present in	Synovial joints
2339.	Fibrous joints give support, cartilaginous joints forms flexible connection	Synovial is for free motion
2340.	Bones of skull, between sacrum and iliac of pelvic girdles are	Fibrous joints
2341.	Cartilaginous joints are connected by fibrocartilage or	Hyaline cartilage
2342.	Joints between vertebrae, between wrist, and ankle bones are	Cartilaginous joints
2343.	Synovial joints are strengthened by number of band like	Ligaments **ETEA-2008**
2344.	A cylindrical projection of one fits into a trough shaped surface is	Hinge joint
2345.	Spherical of hemispherical head of one another articulates with the cup like socket of one another is	Ball and socket joint
2346.	Hinge joints permits movement in	One plane
2347.	Ball and socket joint permits movements in	Two plane
2348.	Elbow and knee joints are	Hinge joints
2349.	Shoulder and hip joints are	Ball and socket joint
2350.	**DISORDERS OF SKELETON**	
2351.	Deformities of skeleton may be genetic, hormonal and due to the	Of nutritional deficiency

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	effect	
2352.	The inner gel like portion are escaped into the surrounding tissues is	Caused by disk slip
2353.	The leaking of jelly like substance can place pressure on the spinal cord	Or on adjacent nerve
2354.	The leaking of jelly like substance which cause pain due to slipping is	Called herniated disk
2355.	The loss of normal spinal structure and function is called spondylosis or	Spinal osteoarthritis
2356.	Spondyliosis can affect cervical (nick), thoracic (mid-back) or	Lumbar(lower back)
2357.	Sciatica refers to pain, weakness, numbness and	Tingling in the leg
2358.	Sciatica is caused by injury to or pressure on the	Sciatic nerve
2359.	A pain disorder involving the narrow muscle in the buttocks are called	Piriformis syndrome **ETEA-2018**
2360.	Slipped disk, periformis syndrome and pelvic injury or fracture or tumors	Causes of sciatica
2361.	Any joint of the body can affected by	Arthritis
2362.	Arthritis is leading cause over the age of	**65**
2363.	Pain, swelling, stiffness, redness, inability are symptoms are	Arthritis
2364.	Broken bone, infection, autoimmune disease and wear and tear on joint	Cause of arthritis
2365.	A fracture is the medical term for the	Broken bone
2366.	The physical force exerted on bone if stronger than the bone itself can	Cause bone fracture
2367.	Simple fracture or closed simple fracture are those in which skin is	Intact
2368.	In compound fracture / open compound fracture bone ends penetrate	The skin and form wound
2369.	Fracture is treated by reduction, the realignment of the	Broken bone ends
2370.	For simple fracture the healing time is	**6-8 weeks**
2371.	Hematoma, cartilaginous callus, bony callus and remolding are	Repair of fracture bone **ETEA-2014**
2372.	Bone when break tissue at the site become swollen, painful and	Inflamed in hematoma
2373.	Soft granulation tissue is called Fibrocartilagenous	callus formation
2374.	Cartilage matrix is secreted by	Chondroblasts
2375.	Bony callus formation continues until a firm union is formed	About **2 months later**
2376.	A dislocated joint is a joint that slips	Out of place
2377.	A severe dislocation can cause tearing of the muscles, ligaments	And tendons
2378.	Cause of joint dislocation are blow, fall and	Trauma of the joint
2379.	Symptoms of joint dislocation are swelling, intense pain and	Immobility of joint
2380.	Rheumatoid arthritis can also cause	Joint dislocation
2381.	A sprain is an injury to the	Ligament
2382.	Commonly injured ligaments are the ankle, knee and	Wrest
2383.	Sprains are usually treated with icing, physical therapy, dressing	And ace wraps
2384.	**MUSCLES**	
2385.	Muscle is specialized tissue of	Mesodermal origin
2386.	The half of human body is made by	Muscles

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2387.	The total numbers of muscles in human are	650
2388.	The function of muscle are to convert chemical energy to	Mechanical energy
2389.	The types of muscles are skeletal, cardiac and	Smooth muscles
2390.	Skeletal muscles are attached to and cover the	Bony skeleton
2391.	Skeletal muscles are voluntary while cardiac and smooth are	Involuntary NMDCAT-2020
2392.	Skeletal muscles get fatigued while cardiac and smooth are	Fatigue free ETEA-2012
2393.	Skeletal muscles are multinucleated while cardiac muscle have	Single nucleus
2394.	Smooth muscles have one centrally placed nucleus	Per cell
2395.	Skeletal muscles are involved in locomotory actions and changes	Of body postures
2396.	Skeletal muscles can exert a	Tremendous power
2397.	Neural control allow the heart to "shift into high gear" for brief	Periods
2398.	Skeletal muscles consist of muscle bundle which further compose	Of muscle fibre
2399.	The muscles fibres are cylindrical, unbranched and with diameter	Of **10-100 µ m**
2400.	Muscle fiber consist of fluid matrix called sarcoplasm containing	Nuclei & mitochondria
2401.	Membrane of fiber is called	Sarcolemma ETEA-2017 NMDCAT-2020
2402.	Cytoplasm of fiber is called	Sarcoplasm
2403.	The sarcolemma penetrate deep into the cell to form tube called	Transverse (T) tubule
2404.	A modified form of endoplasmic reticulum which stores calcium	Is sarcoplasmic reticulum
2405.	The nerve impulse is carried through the T-tubule to the adjacent	Sarcoplasmic reticulum
2406.	Fibre may be red due to presence of	Myoglobin
2407.	Fibre contain myoglobin and	Glycogen
2408.	The sarcoplasm of the fibre contain contractile elements called	Myofibrils
2409.	The diameter of muscle fibre is	**10-100 µ m**
2410.	The diameter of myofibrils is	**1-2 µ m**
2411.	The striped appearance of myofibrils is due to alternate	Light and dark bands
2412.	Myofibrils contain smaller contractile units called	Sarcomere
2413.	The dark bands are A band	Anisotropic
2414.	The light band is I band	Isotropic
2415.	Each A band has a lighter band in its center called	H-zone (hele for bright)
2416.	The H-zone inturn is bisected by	M-line (medial line)
2417.	The I band have midline called	Z-line (zwish means b/w)
2418.	A sarcomere is the region of a myofibril b/w two successive	Z-lines ETEA-2015
2419.	The functional unit of muscle in contraction is	Sarcomere
2420.	The thick filament contain protein called	Myosin
2421.	The thin filament is composed of protein called actin with	Tropomyosin & troponin ETEA-2015
2422.	The two globular heads of thick filament is called	Cross bridges
2423.	Muscles contraction is essential for all movements except Growth	Cytoplasmic streaming ETEA-2014
2424.	The currently popular model of muscle fiber is called the	Sliding filament hypothesis

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2425.	The Sliding filament hypothesis model was proposed by	H.E.Huxuly and A.F.Huxely
2426.	Thick and thin slide each other in contraction but are not changed	In length
2427.	Thick filament heads are combined with thin filament when reorientation occur in thin filament by secretion from sarcoplasmic reticulum of	Calcium ions
2428.	Myosin of thick filament combines by power of ATP energy with	Actin of thin filament
2429.	The actin filament moves one notch past the	Myosin filament
2430.	sarcoplasmic reticulum re-accumulate calcium ions by active	Active transport
2431.	All the muscle fibres triggered by a single neuron contract as a	Motor unit
2432.	An enzyme which break ATP to ADP is called	ATPase
2433.	Energy of muscle contraction come from carbohydrates+glycogen	Stored as glycogen muscles
2434.	In intensive muscular activity phosphocreatine is break to creatin &	Phosphate(P+ADP=ATP)
2435.	The energy utilized for muscular contraction is	**35%**
2436.	**MUSCLE PROBLEMS**	
2437.	Muscle cramps are sudden, involuntary contractions or spasm of	One or more muscles
2438.	The familiar example of temporary contraction is	Writer's cramp **ETEA-2012**
2439.	Muscle cramps can be caused by nerve that	Malfunction
2440.	Less supply of blood or minerals and dehydration and overusing	Causes of muscle cramp
2441.	The maximum capacity of contraction of muscles reduced in	Muscle fatigue
2442.	In muscle fatigue the cross bridges are unable to detach due to	Unavailability of ATP
2443.	Excessive intracellular accumulation of lactic acid in muscle	To ache and raises H^+
2444.	Tetany is symptom characterized by muscle cramps and	Spasm or tremors
2445.	A common cause of tetany is very low level of	Calcium in the body
2446.	The repetitive actions of the muscles happen when muscle contracts uncontrollably	Tetany
2447.	Tetanus **is infection of the nervous system** with the potentially deadly bacteria	Clostridium tetani **ETEA-2019**
2448.	Spores of bacteria clostridium tetani live in the	Soil
2449.	In the spore form clostridium tetani can remain infectious for	**40 years**
2450.	Clostridium tetani produce a poisen in human body called	Tetanospasmin
2451.	Tetanospasmin when enter to body it block nerve signals from spinal cord to the muscle, causing serve	Muscle spasm
2452.	The spasm is so powerful that they tear the muscles or cause	Fractures of the spine

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HUMAN SKELETON				
Axial	Skull	Skull (8)	Unpaired bones ETEA-2019	frontal
				Occipital
				Sphenoid
				Ethmoid
			Paired bones	Parietal
				Temporal
		Facial Bones (14)	Unpaired bones	Mandible
				Vomer
			paired bones	Maxilla
				Zygomatic
				Nasal
				Lacrimal
				Palatine
				Inferior concha
		Ear bones (6)	Unpaired bones	-
			paired bones	Malleus
				Incus
				Stapes
	Vertebral Column	Cervical (7) ETEA-2019		
		Thoracic (12)		
		Lumbar (5)		
		Sacral (5)		
		Coccyx (4) ETEA-2008		
	Ribs	True ribs (7)		
		False ribs(3)		
		Floating ribs (2)		
appendicular	Pectoral Girdle + fore limb	Pectoral girdle		Clavicle
				Scapula
				Supra scapula
		Fore limb		Humerous
				Radius
				Ulna
				Carpals
				Meta carpals
				Phalanges
	Pelvic girdle + hind limb	Pelvic girdle		Ilium
				Ischium
				Pubis
		Hind limb		Femur
				Tibia
				Fibula
				Tarsal
				Metatarsal
				phalanges

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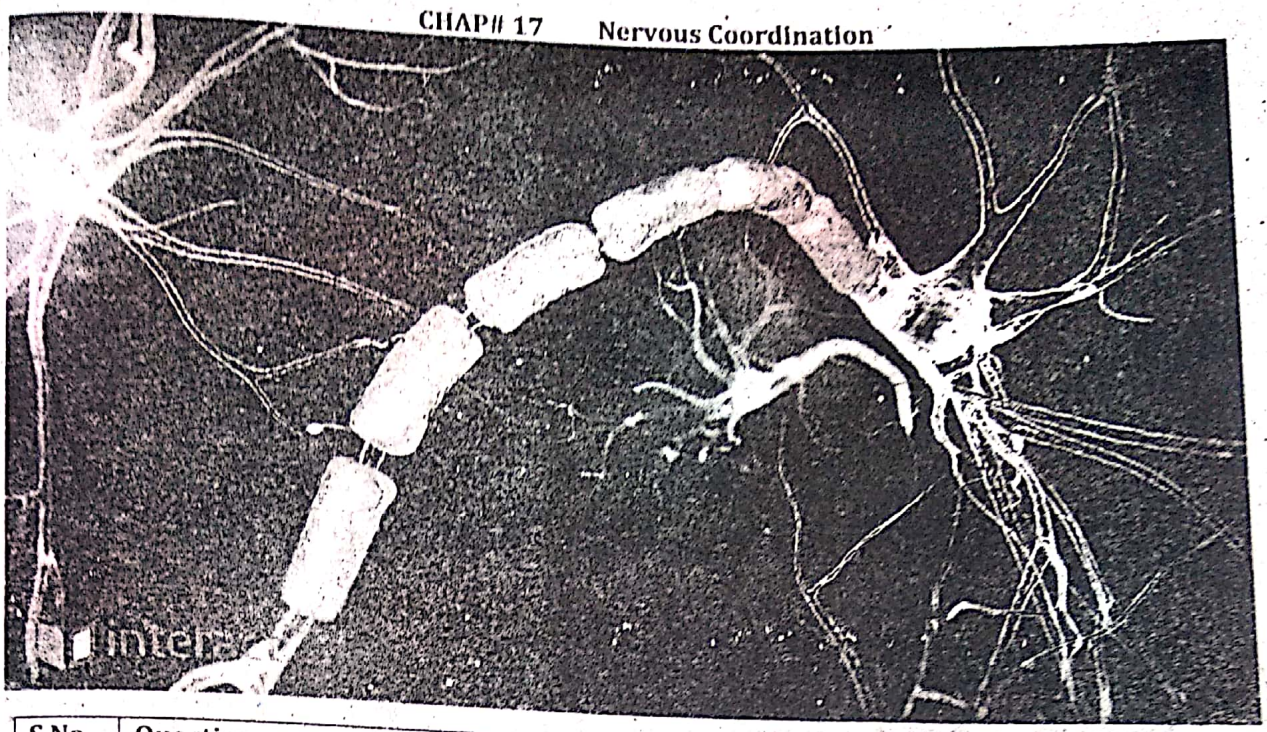
CHAP# 17 Nervous Coordination



S.No	Questions	Answers
2453.	**STEPS INVOLVED IN NERVOUS COORDINATION**	
2454.	The fnctional unit of nerbous system is	Neuron ETEA-2019
2455.	Nervous coordination comprises of units called	Neurons
2456.	The function of neuron is detection, integration and	Command
2457.	Parts that receive stimuli from internal /external of body is called	Receptors or transducers
2458.	A receptor may be complete organ or cell or just	Neuron endings
2459.	Photoreceptors (rods & cones) detects	Light stimuli
2460.	Chemoreceptors (olfaction, gustation & osmoreceptors) detects	Ions or molecules ETEA-2008
2461.	Receptor that detect change in pressure, position or acceleration, hearing and equilibrium(ear)	Mechanoreceptors ETEA-2013
2462.	Receptors which detect temperature stimuli are called	Thermoreceptors
2463.	Receptors:	

Detect	Present in	Receptors
Pain	Skin	Nociceptors ETEA-2014
Smell	Nasal epithelium	Olfaction
Taste	Tongue	Gustation
Osmotic Pressure	Hypothalamus	Osmoreceptors
Touch	Skin	Meissner's corpuscles
Stretch or pressure		Pacinian's corpuscle (skin) Baroreceptors(blood vessels) ETEA-2018

2464.	The part of the body which produce appropriate response are called	Effectors (muscles /glands)
2465.	**NEURONS**	

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2466.	50% of nervous system consist of	Neurological cells. ETEA-2017
2467.	The chief structural and functional unit of nervous system is	Neuron
2468.	Dendrites of neuron receive information from receptors and increase	Surface area of neuron
2469.	Dendrites are	Non-myelinated
2470.	The cell body contains one nucleus, many mitochondria, microtubules,	& Nissl's granules
2471.	Collection of group of ribosomes associated with RER and golgi apparatus are called	Nissl's granules. ETEA-2015
2472.	Dendrites are	Thin fibres
2473.	Axons are	Thick fibres
2474.	The cytoplasm of axon is called	Axoplasm
2475.	Axons are covered by	Schwann cells (neuroglia)
2476.	Axons are called myelinated fibers due to fatty substance covering	Myelin sheath
2477.	A non myelinated part of axon between two shwann cells are called	Node of ranveir
2478.	Velocity of impulse in axon fibre depends on its diameter, its length and	Myelin sheath
2479.	When axon is larger and thicker the transmission of information is	Faster ETEA-2016
2480.	The transmission of information in myelinated than non myelinated is	Faster
2481.	**Radiating form cell body Neuron having** • One fiber are called Unipolar neuron • Two fiber are called Bipolar neuron • Many fiber are called Multipolar neuron	
2482.	The neuron which carry impulse from receptors to CNS	Sensory neuron
2483.	Neuron involved in processing and interpretation of data from receptors	Associative/intermediate
2484.	The neurons which carry impulse from CNS to the effectors are called	Motor neuron
2485.	Sensory neuron is mono polar while intermediate and motor neurons	Are multi polar
2486.	There is no clear difference b/w dendrites and axons of	Sensory neuron
2487.	There is highly numbers of dendrites and give raise to tree like structure	Associative neuron
2488.	Short axon and long dendrites	Sensory neurons
2489.	Long axon and short dendrites	Motor neuron
2490.	**REFLEX ARC**	
2491.	The pathway of nerve impulse during reflex action is called	Reflex arc
2492.	Reflex activities have no involvement of	Brain
2493.	Peripheral branch of sensory neuron transmits information to the	Dorsal root ganglion
2494.	A synapse made on associative neuron to the form to inform of danger	Is send by sensory neuron
2495.	**NERVE IMPULSE**	
2496.	A wave of electrochemical change which travels along length of	Is called nerve impulse

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	neuron	
2497.	In case of neuron the electrical potential is termed as	Membrane potential
2498.	More positive outer surface than inner surface is called	Resting membrane potential
2499.	The state Resting membrane potential is also called	Polarized state
2500.	The potential in rest with inside negative to outside positive is	**-70 millivolts**
2501.	Concentration of K^+ inside to fluid to outside is	**30 times**
2502.	Concentration of Na^+ in outside to inside is	**10 times**
2503.	when **2** K^+ are active transported inward the number of Na^+ transported	Outward is **3** (energy use) **ETEA-2014** **ETEA-2016**
2504.	Negative organic ions present inside in neuron cytoplasm are proteins,	Amino acids, DNA and RNA
2505.	Cell membrane of neuron has many channels proteins called	Gates
2506.	K+ ions moves out of neuron to make more positive inside through	Non-voltage regulated gates
2507.	More positive charge on outside than inside of neuron are called	Resting membrane potential
2508.	Inside more positive charge than outside(depolarized state) are called	Active membrane potential
2509.	Active membrane potential is also called	Action potential
2510.	Stimulus capable to bring an electrochemical change Threshold stimulus	Or adequate stimulus
2511.	Stimulus not capable to bring an electrochemical change Sub threshold	Or inadequate stimulus
2512.	By threshold stimulus,Na^+ diffuse to inside neuron by	Voltage regulated Na gates
2513.	Due to diffusion of Na^+,electric potential from -70mV towards 0 and then reach to the	50mV
2514.	The reversal of polarity across two sides of membranes are called	Depolarization
2515.	Until Na^+ gates are closed the depolarized state lasts for	One milli second
2516.	After the peak of action potential, called the	Spike potential
2517.	Na^+ gates opens, inside neuron become more positive then outside	Depolarization
2518.	Na^+ gates closed, inside regain original polarity(inside more negative than outside)	Repolarization
2519.	The period of recovery of nerve fiber is called	Refractory period
2520.	The types of nerve impulse are continuous impulse and	Salutatory impulse
2521.	Type of impulse in which action potential flows as a wave	Continuous impulse
2522.	The kind of jumping impulse from node of Ravinar to node of Ravinar	Saltatory impulse
2523.	In non-myelinated neuron fibers, the type of nerve impulse is	Continuous impulse
2524.	In myelinated neuron fibers, the type of nerve impulse is	Salutatory impulse
2525.	Average speed of nerve impulse is	**100-120** m/s
2526.	The speed of nerve impulse is 20 time faster in myelinated neuron fiber due to	Saltatory conduction
2527.	Myelinated neuron fibers require less energy from	Non-myelinated
2528.	Impulse is conducted faster in neuron that is	Thick, from thin

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2529.	Grater the thickness, lesser the resistance to nerve impulse and so	Impulse move faster
2530.	**SYNAPSE**	
2531.	In electrical synapse the synaptic cleft is of	0.2 nm
2532.	In chemical synapse the synaptic cleft has gap of more than	20nm
2533.	In electrical synapse the synaptic cleft is enough to depolarize the	Post synaptic membrane
2534.	In electrical synapse the impulse formation is transmitted by means of	Neurotransmitters
2535.	The axon terminals of pre synaptic neurons have expanded tips called	Synaptic knobs
2536.	Synaptic knobs contain synaptic vasicles which contain 10,000	Neurotransmitter substance
2537.	Synaptic vasicles are fuse with pre synaptic memrbrane and release	Neurotransmitters
2538.	Neurotransmitters fuse with post synaptic membrane which open	Channels for Na^+ ions
2539.	Action potential produced by Na^+ which brings membrane potential towards threshold level, it is called	Excitatory postsynaptic potential (EPSP)
2540.	The hyperpolarization of post synaptic membrane by opening channel for K^+ or Cl^- is called	Inhibitory postsynaptic potential (IPSP)
2541.	Enzyme that catalyze the hydrolysis of acetylcholine neurotransmitter is	Actylcholinestrase
2542.	Enzyme that catalyze the hydrolysis of adrenalin is	Monoamine oxides
2543.	The chemical messengers of nervous system are	Neurotransmitters
2544.	Acetylcholine, biogenic amine, amino acid, neuropeptides, and gases	Classes of Neurotransmitter
2545.	Neurotransmitters that produce excitation on postsynaptic neuron receptors are called	Excitatory neurotransmitters e.g Acetylcholine
2546.	Neurotransmitters that inhibits the postsynaptic action potential are called	Inhibitory neurotransmitters e.g Serotonin
2547.	**ORGANIZATION OF HUMAN NERVOUS SYSTEM**	
2548.	Centralized nervous system is the characteristic of the most animals	From flat worm to chordates
2549.	Central nervous system(CNS) act as coordinating system while peripheral nervous system(PNS) providers communication	Among receptors, CNS and effectors
2550.	Central nervous system consist of	Brain & spinal cord
2551.	Brain is involved more in coordination than	Spinal cord
2552.	Spinal cord is the link between	PNS & brain
2553.	Brain and spinal cord is protected by	Skeleton, meninges & CSF
2554.	The part of skeleton that protect brain and spinal cord are	Cranium & vertebral column
2555.	The meninges protects the brain and spinal cord by providing	Cushion like matrix
2556.	The dura mater, the arachnoid mater and the pia mater	Three layers of meninges
2557.	The cerebrospinal fluid (SCF) is produced from blood vessels of brain and spinal cord by a combined process of	Diffusion, pinocytosis and active transport
2558.	The CSF is found **between Pia mater and arachoid mater**, around surface of brain and spinal cord, in the ventricles of brain and in central	Hollow of spinal cord **ETEA-2015**

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2559.	CSF protects brain and spinal cord from	Mechanical shocks
2560.	CFS play a role in metabolism of central nervous system and its	Homeostasis
2561.	Human brain is divided into three parts	Forebrain, midbrain & hindbrain
2562.	Forebrain is subdivided into	Telencephalon & diencephalon
2563.	The telencephalon consists of a pair of	Olfactory bulbs & cerebrum
2564.	The olfactory bulbs are connected with the	Sense of smell
2565.	The cerebrum has many folds that are related with	Intelligence
2566.	The 1st largest part of brain is	Cerebrum
2567.	The 2nd largest part of brain is	Cerebellum
2568.	The two cerebral hemispheres are connected by	Corpus callosum
2569.	Sight, smell, **speech**, touch, **hearing**, learning, memory, thinking, decision making reasoning and judgment are controlled by	Cerebrum **ETEA-2007-2010-2012**
2570.	The diencephalon harbours limbic system, collectively representing parts of Thalamus, hypothalamus,	amygdala & hippo campus **ETEA-2014**
2571.	Thalamus is a relay station between	Body & cerebrum
2572.	Hormone production, regulation of temperature, **hunger**, thirst, sexual response, the fight or flight response and biorhythms are functions of	Hypothalamus **ETEA-2018** **NMDCAT-2020**
2573.	Formation of long term memory and learning are function of	Hippocampus **ETEA-2014**
2574.	The midbrain function is the coordination and relay of	Visual & auditory information
2575.	A network of neuron running through the medulla in hind brain, through the midbrain and up into the thalamus of the forebrain	Reticular formation
2576.	Filtering the sensory information, midbrain receive input from sense	& send output to higher brain center
2577.	The hindbrain consist of pons, cerebellum and	Medulla oblongata
2578.	Pons act as impulse conducting bridge between	Cerebellum, medulla oblongata and cerebellum
2579.	Pons are concerned with rate of	Sleep,breathing & wakefulness
2580.	Cerebellum consist of a central lobe and	Two lateral lobes
2581.	Muscle activity and guide smooth and accurate motion are function of	Cerebellum **ETEA-2015**
2582.	The posterior most portion of the brain is	Medulla oblongata
2583.	Medulla oblongata is the connection between	Body & brain
2584.	Special reflexes such as heart beat, **respiratory movements**, salivary secretions, **swallowing, vomiting**, coughing and sneezing are located in	Medulla oblongata **ETEA-2010-2015-2016-2017**
2585.	The central cable of nervous system is	Spinal cord
2586.	The length of spinal cord	**18 inch**

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2587.	The width of spinal cord	0.5 inch
2588.	The gray matter of spinal cord consist of	Cell bodies
2589.	The white matter of spinal cord consist of	Nerve fibres
2590.	The spinal cord is covered with thin pigment membrane called	The pia mater
2591.	The neural canal is lined with thick tough membrane called	The dura mater
2592.	The space between two membranes of spinal cord are filled with	Lymphatic fluid
2593.	The lymphatic protect the spinal cord from	Shocks
2594.	Below the neck region the reflex actions are controlled by	Spinal cord
2595.	Sensory impulse from the skin and muscles are conducted by	Spinal cord
2596.	Peripheral nervous system consist of	Sensory and motor neurons
2597.	In peripheral nervous system the neuron are distributed in the form of	Ganglia and nerves
2598.	The collection of the neuron cell bodies are called	Ganglia
2599.	Ganglia interconnect with other ganglia to form complex system called	Plexus
2600.	The bundle of neuron fibers covered by connective tissues are called	Nerves
2601.	With respect to function the types of the nerves are	Sensory, motor and mixed
2602.	With respect to origin the types of nerves are	Spinal & cranial nerves
2603.	Nerves which carry impulse from receptors to CNS	Sensory nerves
2604.	Nerves which carry impulse from CNS to effectors	Motor nerves
2605.	Nerves which are group of sensory and motor nerves are called	Mixed nerves
2606.	Nerves which originate form and lead to the spinal cord are called	Spinal nerves
2607.	Nerves which originate form and lead to the brain are called	Cranial or cerebral nerves

2608. **The total number of spinal nerves airs are 31 (31 pair, 62 nerves). Which are grouped as:**

ETEA-2019

Nerves	No
Cervical	8
Thoracic	12
Lumbar	5
Sacral	5
Coccygeal	1

2609. Vagus nerve extends up to the — Abdomen

2610. **The total number of pairs of cranial nerves are 12 pairs, Functionality:**

Sensory nerves (3)	1, 2, 8
Motors nerves (5)	3, 5, 6, 11, 12
Mixed nerves (4)	4, 7, 9, 10

Sen;mix;motore= 3;4;5 **ETEA-2019**

2611. Somatic nervous system (SNS) carry information between — CNS & voluntary body parts

2612. Somatic nervous system (SNS) controls skeletal muscles as well as — External sensory organs (skin)

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2613.	Autonomic nervous system (ANS) runs between the Nervous system especially hypothalamus	& internal organs (heart, lungs, viscera, glands)
2614.	The contraction of smooth and cardiac muscles are controlled by	Motor neurons of ANS
2615.	The actions of autonomic nervous system are largely	Involuntary
2616.	The Parasympathetic division controls autonomic functions during	State of rest
2617.	The Sympathetic division controls autonomic functions during	State of emergency ETEA-2017

2618. **The autonomic nervous system are further divided into Parasympathetic and Sympathetic**

PARASYMPATHETIC	SYMPATHETIC
Constrict pupil	Dilate pupil
Stimulate flow of saliva	Inhibits flow of saliva
Slow heartbeat	Fast heartbeat
Constrict bronchi	Dilate bronchi
Stimulates peristalsis	Inhibit peristalsis
Stimulate secretions	Inhibit secretions
Stimulate release of bile	Conversion of glycogen to glucose
Inhibit adrenaline and non-adrenaline secretion	Secretion of adrenaline and non-adrenaline
Contract bladder	Inhibit bladder contraction

2619.	Sympathetic system prepare the body for violent activity in	Danger
2620.	When danger is over, the body becomes normal by	Parasympathetic
2621.	**STRUCTURE AND FUNCTION OF SPECIAL RECEPTORS**	
2622.	The tongue contain many ridges and valleys called	Papillae

2623. **There are four types of papillae**

S.NO	NAME	SHAPE	FOUND AT
1	Filiform papillae	cone	All over the tongue
2	fungiform papillae	Mushroom shaped	Sides of tongue
3	foliate papillae	Series of folds	Sides of tongues
4	circumvallate papillae	Flat mounds	Back of tongue

2624.	The circumvallate papillae are surrounded by	Trench
2625.	All papillae contain taste buds except	Filiform papillae
2626.	The center of the tongue is called	Taste-blind
2627.	Taste bud contain number of taste cells that have tips that protrude	Into the taste pore
2628.	The site of olfactory transduction, located in nasal cavity is	Olfactory mucosa
2629.	Olfactory mucosa contain olfactory receptor neuron, olfactory receptor neuron have cilia which contain	olfactory receptor proteins
2630.	The total types of olfactory receptor proteins are about	**1000**
2631.	Smell also called	Olfaction
2632.	Touch, also called	Tactition or mechanoreception
2633.	Pain receptors are also called	Nociception

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2634.	Hair follicle are touch receptors, so removal of hair	Decrease touch sensitivity
2635.	Touch receptors are found in	Tongue, throat & mucosa
2636.	The fingertips and tongue have as touch receptors as	**100 per cm²**
2637.	The back of hand have as touch receptors as	**10 per cm²**
2638.	Loss or impairment of the ability to feel anything touched is called	Tactile anesthesia
2639.	Sensation of tingling, pricking, numbness of skin result from nerve damage are called	Paresthesia
2640.	Paresthesia may be	Temporary or permanent
2641.	When sensory nerve fibers are exposed to extremes, the	Signal pain
2642.	The main function of pain is to	Warm us about danger
2643.	There are three types of pain receptors	

S.no	Name	Found in
1	Cutaneous	Skin
2	Somatic	Joints and bones
3	visceral	Body organs

2644.	**EFFECTS OF DRUGS ON NERVOUS SYSTEM**	
2645.	Heroin is processed from morphine which is extracted from	Poppy plants **ETEA-2014**
2646.	The chemical name of morphine are	Diamorphine & diacetylmorphine
2647.	The heroine is gives as subcutaneous, intramuscular and	Intravenous route
2648.	In pain such as trauma, myocardial infraction, post-surgical pain and chronic pain, we use	Heroine
2649.	Long term uses of heroine addiction disease are	HIV,AIDs & hepatitis B & C
2650.	Cannabis (cannabis sativa) are also known as	Marijuana
2651.	Hashish are commonly known as	Chars **ETEA-2012**
2652.	Hashish (form of cannabis) is produced from the flowers of the	Female cannabis plant
2653.	For amelioration of nausea and vomiting, stimulation of hunger in chemotherapy and AIDs patients, lower intraocular eye pressure(glaucoma) we uses	Hashish
2654.	Restlessness, feel loss control, panic, fear of impending death, depression, suicidal thoughts and psychosis	Common adverse effects of abuse cannabis
2655.	Nicotine is an alkaloid found in tobacco leaves and plants of family	Solanaceae
2656.	Acetylcholine, norepinephrine, epinephrine, serotonin, vasopressin, dopamine, and beta-endorphin.	Chemical messengers release by Nicotine
2657.	Nicotine act as Nerve stimulant and	Sedative/pain killer
2658.	Higher dose of nicotine enhance effect of serotonin and beta-endorphin and produce	Calming, pain-killing effect
2659.	Nicotine is sold commercially in the form of	Pesticide
2660.	An adult can be killed by nicotine by an amount of	**60 mg**
2661.	In cigarette if nicotine is 60mg then number of cigarette is	**4**
2662.	Vomiting, nausea, headaches, breathing difficulty and stomach pain	Caused by nicotine poisoning
2663.	In smoker mother nicotine damages the	Placenta

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2664.	Cigarette to mother leads to miscarriages, pre mature birth and	Damage to the fetus
2665.	The drug which is absorbed quickly into blood among other drugs	Alcohol
2666.	Alcohol when used in low amount	Improve health conditions
2667.	Alcohol is used to wash wounds due to its	Antiseptic nature
2668.	Alcohol reduces level of the serotine and dopamine and act as a	Depressant
2669.	People who drink too much lose control of	Speech and movement
2670.	Hallucitions cause by alcohol drinking (patient imagines that they are in magical world). This disease are also called	Paranoia
2671.	Inhalants are chemical vapours or gases that produce	Psychoactive
2672.	**NERVOUS DISORDERS AND DIAGNOSTIC TESTS**	
2673.	Diseases of nervous system are also called	Neurological disorders
2674.	**Neurological disorders are classified into following categories**	

S.no	Name	Type
1	Stroke	Vascular **ETEA-2013**
2	Meningitis	Infectious
3	Brain tumor	Structural
4	Headache	Functional
5	Alzheimer's disease	Degenerative **ETEA-2017**

2675.	Stroke is also known as	Cerebrovascular accident(CVA)
2676.	In stroke the blood supply to brain is disrupted, causing brain cells to	Die
2677.	**There are two kinds of stroke**	

S.no	Name	Cause
1	Isochemic stroke	Blood clot
2	hemorrhagic	Blood vessel

Mini-strokes or transient ischemic attacks (TIAc), occur when blood supply to brain is briefly interrupted

2678.	One side numbness, trouble speaking, balance/coordination loss	Stroke symptomes
2679.	Treatment of strokes are Clot bursting drugs , Blood thinners and	Thrombolytic therapy Such as heparin
2680.	Inflammation of membrane of brain and spinal cord	Meningitis
2681.	Meningitis can caused by infection with drugs,	Virus, bacteria, microorganism
2682.	Head and neck arched backward, agitation, rapid breathing, sensitivity to light, stiff neck, unusual posture	Symptoms of meningitis
2683.	Antibiotics and corticosteroids are used as general treatment for	Meningitis
2684.	A brain tumor is the mass or growth of abnormal cells due to	Uncontrolled cell division
2685.	A brain tumor may be	Benign(noncancerous) or malignant (cancerous)
2686.	A tumor that originate in the brain are called	Primary brain tumor
2687.	A tumor that originate in the parts of brain and spread to the brain are Called	Secondary brain tumor or metastatic brain tumor
2688.	Treatment and Sign and symptoms of brain tumor depends upon	Tumor size & location &

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		growth rate
2689.	Surgery, radiotherapy and chemotherapy are general treatment for	Brain tumors
2690.	Headache or cephalalgia is pain anywhere in the region of	Head and neck
2691.	The brain tissue is not sensitive to pain because it lacks	Pain receptors
2692.	Muscle tension in the face, neck and shoulders may cause	Tension headache
2693.	Alzheimer's disease is impairment of memory and disturbance in	Reasoning, planning, language and perception
2694.	Alzheimer's disease increase substantially after the age of	70
2695.	Alzheimer's disease may effect around 50% of persons over the age of	85
2696.	Alzheimer's disease result from increase of proteins called	Beta-amyloid protein ETEA-2015

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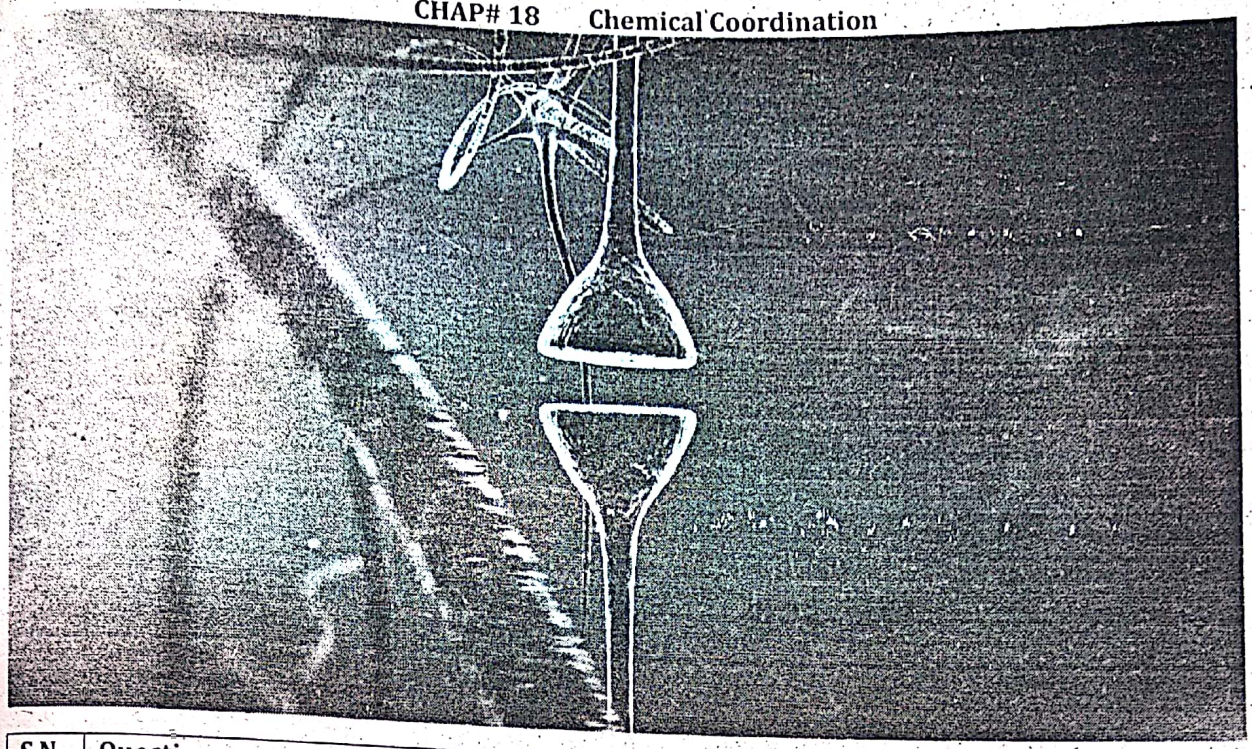
CHAP# 18 Chemical Coordination



S.No	Questions	Answers
2697	**HORMONES: THE CHEMICAL MESSENGER**	
2698	Glands are one/more cell that make and release some product called	secretion
2699	Exocrine glands secrete their product onto the target surface	Directly or through ducts
2700	Liver, salivary glands, sweat glands and the tears glands have	Ducts
2701	Unicellular goblet cells release mucin in the target surface by	Exocytosis **ETEA-2018**
2702	Endocrine glands are Ductless gland, they produce hormones and secrete directly into the	Extracellular space and then to blood / lymphatic fluid
2703	The goblet cell is	Unicellular exocrine gland **ETEA-2018**
2704	Mucin is complex glycoprotein that dissolves into water to form	Mucus
2705	Hormones may be steroidic, amino acidic or	Proteinous **ETEA-2019**

ETEA-2019

	TYPES	GLAND	HORMONE	
1.	Steroid hormones **ETEA-2016**	Adrenal gland	Cortisol & aldosterone	
		The ovaries	Estrogen & progesterone	
		The testes	Testosterone	
		The placenta	Estrogen & progesterone	
2.	Derivatives of amino acid tyrosine	Thyroid gland	Thyroxin & triiodothyronin	
		Adrenal medulla	Epinephrine & nonepinephrine	
3	Proteins or polypeptides	**(1) Protein Hormone**	Growth hormone	Prolactin hormone
		(2) Peptides Hormones	Antidiuretic hormone	oxytocin hormone

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		(3) Large polypeptides Hormones	Insulin & glucogon hormone	Parathormone hormone

2706.	Steroid hormones are derivatives of	Cholesterol
2707.	**ENDOCRINE SYSTEM OF MAN**	
2708.	Pituitary gland is located in the brain under the	Hypothalamus
2709.	Pituitary gland is pea shaped and gray colour and its weight is	0.5g ETEA-2016
2710.	Pituitary gland is attached to hypothalamus by a stalk called	Infundibulum ETEA-2019
2711.	Master gland of endocrine system is	Anterior pituitary lobe ETEA-2016
2712.	The number of glands in endocrine system are	20
2713.	Adrenocorticotropic hormone(ACTH) is also called	Corticotrphic hormone
2714.	Deficiency of growth hormones (GH) results in	Dwarfism ETEA-2012
2715.	Over secretion of (GH) in childhood results	Gigantism
2716.	Over secretion of (GH) in adult life results	Acromegaly
2717.	In dwarfism body parts stay in proportion and brain development and IQ	Are unaffected
2718.	In males Interstitial cell stimulating hormone (ICSH) is used for	Luteinzing hormone(LH)
2719.	Conversion of ruptured follicle to a glandular structure called	Corpus luteum
2720.	Release of thyrotropin releasing factor from the hypothalamus is controlled by	Thyroxine level in the blood
2721.	Release of corticotropin releasing factor from the hypothalamus is controlled by	steroid level in the blood or direct nervous stimulation
2722.	Thyroid gland is composed of two lobes on either side of the trachea	Inferior to the larynx
2723.	Thyroid gland produce three active hormones triiodothyronine (T_3)	Thyroxin(T_4) & calcitonin
2724.	Triiodothyronine (T_3) and Thyroxin(T_4) are	Iodine containing hormone
2725.	Triiodothyronine (T_3) contain	Three iodine
2726.	Thyroxin(T_4) contain	Four iodine
2727.	Thyroid gland hormone promote basal metabolic rate of the body enhance glucose catabolism and synthesis of cholesterol in the	liver
2728.	The development nervous system in feotus and infants are promoted by	Thyroid hormones
2729.	The hormone which promote normal motility of the gastrointestinal tract	Thyroid hormones
2730.	Over activity of thyroid causes	Graves' disease
2731.	In Graves; disease the patients contain abnormal antibodies that mimic TSH and continuously stimulate	Thyroxin release
2732.	Exophthalmia is protrusion of the eyeball results from the	Graves' disease ETEA-2017
2733.	Thyroid hormone in the blood decreases due to absence of	Iodine
2734.	The decrease of the thyroid hormone level are detected by	Anterior pituitary gland

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2735.	If there is deficiency of thyroxin from birth, it results hypothyroidism	Called Cretinism
2736.	When thyroid is over secreted it enlarge thyroid called	Goiter
2737.	In adults, the full-blown hypothyroid syndrome is called	Myxedema
2738.	Myxedema may result from lack of iodine, the thyroid gland enlarges and protrudes. this condition is called	Endemic or colloidal goiter
2739.	Calcitonin is secreted by	Thyroid gland
2740.	Calcitonin play a direct role in the extracellular level of the	Ca^{++} ions ETEA-2015
2741.	When level of calcium rise the calcitonin promotes calcium	Deposition into bones
2742.	Calcitonin inhibits absorption from the kidney of	Calcium and potassium
2743.	The number of parathyroid gland in human are 4 which are located on	Thyroid gland
2744.	Parathormone stimulates osteoclasts to reabsorb bone mineral and	liberting Calcium into blood
2745.	Absorption of calcium from small intestine and kidney tubules are	stimulated by parathormone
2746.	Over secretion of the parathormone is usually a result of the	Parathyroid gland tumor
2747.	Excess calcium salts precipitate in the kidneys leading to	Stone formation
2748.	Under secretion of parathormone causes	Hypocalcemia
2749.	The pancreas is double gland as it serves both an	Exocrine & endocrine gland
2750.	The bulk of pancreas is exocrine and is formed of	Acinar cells
2751.	Pancreatic juice is delivered to duodenum by pancreatic duct during	Food digestion
2752.	Endocrine pancreas consist of	Islets of Langerhans
2753.	In humans the numbers of islets scattered among acinar cells are about	One million ETEA-2014
2754.	Glycogenesis in liver and muscle cells are promoted by	Insulin
2755.	Glycogenolysis is promoted by	Glucagon
2756.	Insulin is released by beta cells in response to rise in	Blood glucose level ETEA-2015 ETEA-2019
2757.	Glucagon is produced by alpha cells when	Blood glucose level is low
2758.	Rate of protein synthesis is increased by	Insulin
2759.	The lossage of glucose in urine is called Glycosuria, this disease is called	Diabetes mellitus ETEA-2013
2760.	A condition in which normally large amount of urine is produced are called	Polyuria ETEA-2019
2761.	A condition of excessive thirst is called	Polydipsia
2762.	A condition of excessive hunger ingestion of food is called	Polyphagia
2763.	Polyuria, polydipsia and polyphagia are three symptoms of	Diabetes mellitus
2764.	Hypersecretion of insulin results in	Hypoglycemia
2765.	Glucagon is an	Hyperglycemic agent
2766.	Sympathetic nervous system stimulates the secretion of the	Glucagon
2767.	Secretion of glucagon is suppressed by high glucose level in blood and	Insulin & somatostatin
2768.	Gluconeogenesis is synthesis of glucose from	lactic acid, Proteins & fats

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2769.	Gluconeogenesis is promoted by	Glucagon
2770.	Human body has a pair of glands one above	Each kidney
2771.	Adrenal gland is composed of two types of tissues Adrenal cortex	And Adrenal medulla
2772.	Adrenal cortex produce steroid hormones , collectively called	Corticosteroids **or** corticoids
2773.	In Corticosteroids the chief mineralocorticoid is	Aldosterone
2774.	Aldosterone is secreted in response of Low blood pressure and low level of	Na^+ and K^+ in blood & ACTH
2775.	Adrenal medulla consist of modified ganglionic sympathetic neurons that synthesize	Epinephrine e& norepinephrine
2776.	Epinephrine is the more potent stimulator of metabolic activities, bronchial dilation, and increased blood flow to	skeletal muscles and the heart
2777.	Norepinephrine has more the greater influence on peripheral vasoconstriction &	Blood pressure **ETEA-2015**
2778.	Epinephrine is used as clinically as a Heart stimulant and to dilate bronchioles during	Acute asthmatic attacks
2779.	Gonads are special type of endocrine glands which beside hormone secretion also produces	Gametes
2780.	Negative feedback is a mechanism to maintain	Homeostasis
2781.	Negative feedback is a reversal of the	Direction of change
2782.	Negative feedback tends to	Stabilize a system

Female gonads are ovaries while male gametes are testes

1	Ovaries	Ova	
		Estrogens	1. Reproductive organ maturation 2. secondary sex characters in females **ETEA-2013** 3. breast development 4. cyclic changes in the uterine mucosa in the menstrual cycle
		Progesterone	a. promotes thickening and vascularization of the uterus for the b. Implantation of zygote c. Maintaining pregnancy d. Breast development during pregnancy
2	Testes	1. produce sperm 2. produce male sex hormone, primarily testosterone 3. male reproductive organ maturation 4. appearance of secondary sex characters 5. sex drive 6. maintain reproductive organs in mature functional state	

2783	If controlling mechanism is itself controlled by the product of reaction it is	Feedback mechanism
2784	Glucose uptake by cells decreases blood glucose levels-this decrease is	Detected by pancreas
2785	Glucagon accelerates break down of the glycogen to glucose in	Liver & skeletal muscle cells
2786	Positive feedback response is to	Amplify change in the variable

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2787.	Positive feedback is destabilizing effect and does not result in	Homeostasis
2788.	**FEEDBACK MECHANISM**	
2789.	Of positive and negative feedback, the less common is	Positive feedback
2790.	Positive feedback enables	Childbirth NMDCAT-2020
2791.	In birth oxytocin stimulates and enhances	Labor contractions
2792.	When baby moves towards earth canal, receptors in muscular part evoke a release oxytocin from the	Pituitary gland
2793.	The baby is born, oxytocin is no longer evoked and	Labor contraction cease

Gland	Hormone	Function
Anterior lobe of Pituitary	• Growth hormone • Adrenocorticotropic hormone • Thyroid stimulating hormone • Luteinising hormone	• regulates development of muscles and bones, stimulates secretion of cortisol and aldosterone by the adrenal cortex • stimulates the thyroid gland to produce its hormone • stimulates the thyroid gland to produce its hormone • stimulates the testes to produce testosterone
Intermediate lobe of pituitary	• melanocyte	• skin colut
Posterior lobe of Pituitary hormone	• Antidiuretic hormone • oxytocin	• increases the reabsorption of water from nephrons • initiates uterine contractions during childbirth • stimulates the flow of milk from the breasts during lactation
Thyroid gland	• Thyroxine • Calcitonin	• stimulates enzymes of cellular metabolism • decreases blood calcium concentration
Adrenal medulla	• Epinephrine Norepinephrine	• initiate body's response to stress and the "fightor flight" response to danger
Adrenal cortex	• Cortisol • Aldosterone	• promotes production of glucose from proteins • promotes salt and water retention by the kidneys
Pancreas	• Insulin • Glucagon • Somatostain • Pancreatic polypeptide	• lowers the blood glucose level by stimulating body cells to store glucose or use it • stimulates release of glucose from the liver intothe blood
Ovaries	• Estrogen • Progesterone	• cause the release of an egg from the ovary and • regulates female secondary sex characteristics
Testes	• Androgens (Testosterone)	• regulate male secondary sex characteristics

	Nervous coordination	Chemical coordination
Modes of coordination	Electrical	Hormonal
Receptors	Sense organs (eyes,ears, nose,tongue, skin)	Many body organs (kidney, liver etc)
Coordinator	Brain and spinal cord	Endocrine glands
Effectors	Muscle and glands	Many body organs (kidney, liver, stomach)
Nature of message	Electrical(nerve impulse)	Chemical (hormones)
Carrier of message	Neurons	Blood
Nature of response	Contraction of muscles Secretin from glands	Various types (eg. Growth, reabsorption of water by kidneys)

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CHAP#19 Behavior

S.No	Questions	Answers
2794.	**NATURE OF BEHAVIOR**	
2795.	The study of animal behavior is called	Ethology
2796.	The aggregate of responses to stimuli for given situation is called	Behavior
2797.	Natural selection is the basis of biological evolution is theory of	Charles Darwin
2798.	Principles of natural selection applied to behavior as well as physical characteristic is principal of	Francis Galton
2799.	In intelligence, moodiness, impulsiveness, shyness and all the psychological characters, the major role is of	Heredity
2800.	A number of biological characteristics of animals fluctuates in some regular	Fashion
2801.	Intrinsic "biological clocks" are involved in regulation such	Cyclic phenomenon
2802.	The organism living in the temperate zones of the world typically show marked seasonal cycle of	Activity
2803.	Most animals have a breeding season once a year usually in the	Spring
2804.	Some animals show decrease in metabolism activity during the winter a phenomenon called	Hibernation
2805.	Adults form of many plants and animals die in the end of summer season and the species is carried over the winter in the form of	Seeds, egg or pupae
2806.	Some organism do not function at constant rate over the entire	24 hours of the body
2807.	Animals which are repeated sequence of events which occur in about 24 hours interval, these have been are termed as	Cardian rhythms **ETEA-2006**
2808.	Circa means about and dies means	Days
2809.	Some animals having their greatest degree of activity During the **Day** are	Diurnal
2810.	Other animals have their greatest activity in the **twilight hours** called	Corpuscular **ETEA-2016**
2811.	Animals showing their larger amount of activity in **dark** are called	Nocturnal

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2812.	Some insects exhibit diurnal variations in	Pigmentations
2813.	There is diurnal deposition and utilization of glycogen in the liver of the	Rabbit and mouse
2814.	Man has also	Circadian rhythm
2815.	Small marine organism tend to concentrate near the surface at	Night
2816.	Other marine animals go to the deeper water during the	Day
2817.	The activities of some animals are adopted to the regularly recurring changes in the external conditions and are called	Biological clocks
2818.	Clocks together with other signals received from the	External conditions
2819.	**INNATE BEHAVIOURS**	
2820.	Innate behavior is inherited or In-born and sometimes called	Instinctive
2821.	Innate behavior are built in nervous system during	Development
2822.	Innate behavior are automatic and machine-like in nature, not forgotten, have survival species for species and are genetically	Programmed

2823. **SOME INNATE BEHAVIORS:**

1. Flying of honey bee towards nectar
2. Spider when wave a web caterpillar when form cocoon
3. Young bird when build nest
4. Old chick when peck object
5. Migration of birds
6. Withdrawal of an acid-stimulated leg by a fresh brainless frog

→ The human suckling reflex are example of complex unlearned behavior **ETEA-2016**

2824.	Individual inherit a suit of behaviors often called an	Ethogram

2825. In general, the innate behaviors will always be;

Heritable	Encoded in DNA and pass from generation to ge eration
intrinsic	Present in animals raised in isolation from others
Stereotypic	Performed in the same way each time by each individual
Inflexible	Not modified by development or experience
Consummate	Fully developed or expressed at first performance

2826.	The basic unit of innate behavior is a	Simple reflex
2827.	Involuntary stereotyped of part of an organism to given stimulus	Simple reflex
2828.	The neural reflex is neural pathway that may involves as few as	Two neurons
2829.	Movement of diaphragm during breathing is example of	Reflex Actions
2830.	The lower leg kicks forward via contraction of	Quadriceps muscles
2831.	The knee jerk is also called	Patellar reflex
2832.	**Simple reflexes** trigger by small disturbance is called	Startle reflexes
2833.	**Complex reflexes** triggered by the large disturbance are called	Escape reflexes

2834. **There are two types of orientation behavior:**

1. Kinesis:
   - it is change in speed of movement (orthokinesis) or change in rate of turning (Klinokinesis)
   - non-directed orientation
   - directly proportional to stimulus
2. Taxis:
   - Movement of whole organism towards the stimulus(+) or away from stimulus(-)
   - Intensity increase towards the stimulus

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	• Intensity decrease with away movement from source • It is directed orientation.	
2835.	Induced movement of curvature shown by plant organs	Tropic movements
2836.	Tropic movement are capable of turning in	Any direction
2837.	The direction of tropic movement are determined by the direction of	Stimulus
2838.	**Tropic movements are classified as under:** 1. Geotropism 2. Phototropism	
2839.	Geotropism occur in radially symmetrical organs like	Root and stem
2840.	In geotropism the orientation is in response to	Force of gravity
2841.	The roots grow in direction of gravity and are called	Positive geotropic
2842.	The stem grown away from force of gravity and therefor called	Negatively geotropic
2843.	The movement of plant in response to unilateral effect of light	Phototropism
2844.	Young stem are positive phototropic, turn towards	Light
2845.	Each individual start life with a	Clean slate
2846.	**LEARNINH BEHAVIOURS**	
2847.	**In general, learned behaviors are always by:**	

1	Nonheritable	Acquired only through observation or experience
2	Extrinsic	Absent in animals raised in isolation from others
3	Permutable	Pattern or sequence may change over time
4	Adaptable	Capable of modification to suit changing conditions
5	Progressive	Subject to improvement or refinement through practice

2848.	Habituation is learning not to respond to some	Unimportant Stimulus
2849.	Habituation is simplest	Learning **ETEA-2019**
2850.	Lack of continued response to strong odour is a common example of	Sensory habitation
2851.	The amazing example genetic and environmental influences on animal behavior	Imprinting
2852.	Imprinting involves a brief sensitive period, also called	Critical period **ETEA-2015**
2853.	In 1930s, Konard Lorenz showed that the principal imprinting stimulus in grayleg geese is nearby object is moving	Away from the young
2854.	In Pavlov experiment he choose metronome as a	Neutral stimulus
2855.	Instrumental learning or operant learning is learning by	Consequence
2856.	Operant behavior can foster adjustment of organism to certain	Situation
2857.	The organism acquires responses or develops skills that lead to	Reinforcement
2858.	Pleasant stimulus that increases the frequency of	Behavior
2859.	Cockroaches learn to run through a simple maze to find food is a simple example of	Instrumental Learning **ETEA-2015**
2860.	Skinner's work with rats in his skinner box led him to discover a process he called	Shaping **ETEA-2014**
2861.	A type of learning that uses reasons, especially to form conclusions, inferences, or judgments, to solve a problem are called	Insight learning
2862.	Insight learning is solving problems not based on actual experiences (like trial and error steps) but on trials	Occurring mentally

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2863.	**SOCIAL BEHAVIOURS**	
2864.	Social behaviors consist of a set of interactions among individual of	Same species
2865.		

Behavior	Examples ETEA-2015
Relatively Asocial Animals	Mosquitos and polar bears
Social Group	Packs of wolves and school of fish
Highly social animals	All ants and termites, some bees and wasps

2866.	In social group a system needed is system of	Communication
2867.	Ants, termites and bees are social insects that live in colonies and have an organization based on a	Cast system
2868.	**Each type of honey bee has a specific role** • In the honey bee colony there is single fertile queen ETEA-2017 • Several thousand sterile female workers • Few hundred fertile male drones	
2869.	A group of behavioral activities including threat posture, rituals and occasionally physically attacks on the organism	Aggression
2870.	Aggression are usually directed towards members of the same	Sex and species
2871.	An aggressive behavior between same species involves fighting over a limit sources such as food, water and space are called	Agnostic behavior
2872.	An area held and depended by an organism or group of organisms against the same or different species are called	Territorial behavior
2873.	Spider monkeys form loose group of	15 – 20 Animals
2874.	Spider group divide into small group of about	2 – 8 Animals
2875.	When two different troops of spider monkeys come together, the male in each troops display agonistic and territorial behavior like	Calling and barking
2876.	In dominance hierarchies (peeking orders), animals with in a group are arranged according th the	Status
2877.	In dominance hierarchies, position is decided by some agonistic form	Rather than Fighting
2878.	The behavior in which certain organism expend time and energy in caring for the other members of the species	Altruistic behavior
2879.	A form of social behavior where one organism put itself either at risk or personal disadvantage for the good of other member of the Species is	Altruistic behavior
2880.	In altruism, female baboon protects and cares for its offspring	For **6 years**
2881.	Most altruistic birds feed and protect their demanding offspring	Until they eat by self
2882.	Altruistic behaviors are seen in social insects such as honey bees,	Wasps and ants

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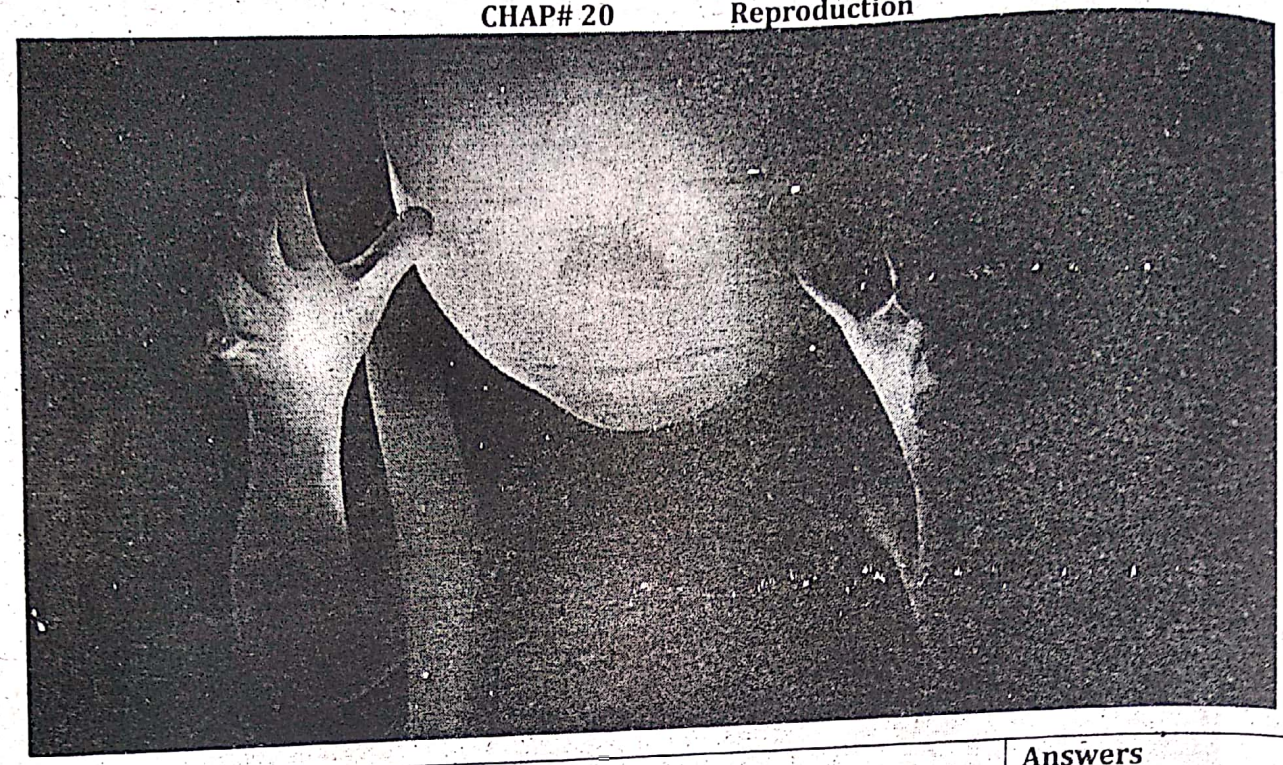
CHAP# 20 Reproduction



S.No	Questions	Answers
2883.	**REPRODUCITON**	
2884.	The most advanced mammals are	Human being
2885.	**MALE RESPRODUCTIVE SYSTEM**	
2886.	**Male reproductive system consist of :** • Pair of testes • Ducts • Gland • External genitalia	
2887.	Testes are male gonads which are outside body and covered by	Scrotum
2888.	Each testes are divided into lobules which are about	250 to 300
2889.	Each lobule contains one to four tightly coiled	Seminiferous tubule
2890.	**Lyeden cells** are present between the seminiferous tubules which produce male sex hormone	Testosterone **ETEA-2015**
2891.	**The accessory duct include:** • Vasa efferentia • The epididymis • The ductus deferene • The ejaculatory duct • The urethra	
2892.	About **10 to 20** vasa efferentia collect sperm from inside the testes and transfer them to the	Epididymis
2893.	The length of uncoiled epididymis is about	**6** m or **20** feet
2894.	The function of epididymis is transport and storage of sperms, here sperms are stored temporary, nourished and gain	The ability to swim
2895.	Vas deferens start from epididymis move back into pelvic cavity and then join with the duct of the seminal vesicle to form the short	Ejaculatory duct
2896.	Each ejaculatory duct enters the prostate, there it empties into the	Urethra

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2897.	The terminal portion of the male duct system is	Urethra
2898.	Urethra open to the outside through external urethral orifice and conveys both	Urine and semen
2899.	The seminal vesicles provide an alkaline fluid containing fructose sugar, ascorbic acid and a coagulating enzyme called	Vesiculase
2900.	The optimum temperature for sperm development is about	35 °C
2901.	The prostate encircle the urethra just below the	Bladder
2902.	Prostate secrete milky, **slightly acidic** fluid that contains citrate as nutrient source and several enzymes especially	Hyaluronidase **ETEA-2017**
2903.	Cowpers' gland secretes mucus and an alkaline fluid into the	Urethra
2904.	The alkaline fluid neutralize the acidity of urine in	Urethra
2905.	White, sticky mixture of sperm and secretion of accessory glands	Is called Semen
2906.	The viscosity of mucus guarding the entry(cervix) is decrease by	Prostaglandins
2907.	Prostaglandins stimulate reverse peristalsis in the Uterus, facilitating sperm movement through the	Female reproductive tract
2908.	The process of sperm formation in males are called	Spermatogenesis
2909.	Spermatogenesis takes place in	Seminiferous tubules
2910.	Spermatogonia are the outer most cells which make the epithelial wall of the	Seminiferous tubules
2911.	Spermatogonia cells are just below the	Basal lamina
2912.	The spermatogonia continuously divide by the mitosis which results in two distinctive daughter cells types	A and B
2913.	The type A daughter cells remains at the basement membrane to	Maintain the germ cell line
2914.	The type B cell get pushed toward the lumen, where it become primary spermatocyte destined to produce	Four sperms
2915.	Each primary spermatocyte undergoes meiosis I, forming two smaller haploid cells called	Secondary spermatocytes
2916.	The secondary spermatocytes goes rapidly on meiosis II, and Produce	spermatids **ETEA-2016**
2917.	Each spermatid is round, nonmotile and	Haploid cell
2918.	Process in which spermatids change into motile and active sperms	Spermiogenesis
2919.	During spermatogenesis a spermatids elongate, sheds its excess cytoplasm and	Forms a tail
2920.	**The sperm or spermatozoon(animal seed) is small and has:** • A head (have nucleus containing haploid chromosomes) • A neck (short and contain pair of centrioles) • A mid piece (contains mitochondria arranged spirally around the axial filament) • A tail	
2921.	Adhering to the top of the head is	Acrosome
2922.	The lysosome-like acrosome are produced by the	Golgi apparatus
2923.	Acrosome contain an enzyme that enables the sperm to penetrate and enter an egg is called	Hyaluronidase
2924.	In sperm microtubule of centriole of neck elongates and run entire	Length of the tail
2925.	The process of the spermatogenesis starts at the age of	14 years
2926.	Every day, a healthy adult male makes about	400 million sperm **ETEA-2017**

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2927.	**Process of spermatogenesis is controlled by hormonal secretion from** 1. Hypothalamus : • It releases gonadotrophin-releasing hormone(GnRH) which controls release of anterior pituitary • gonadotrophin follicle-stimulating hormone(FSH) : → FSH stimulates spermatogenesis by stimulating sertoli cells to complete the development of sperm from spermatids • Luteninzing hormone(LH →LH stimulates lyedig cells to release testosterone 2. Pituitary gland	
2928.	Cells of testes that are part of seminiferous tubules	Sertoli cells
2929.	Cells that are found adjacent to the seminiferous tubules in testicle	Lyedig cells
2930.	Testosterone cause the growth and development of germinal epithelium to	Form sperm
2931.	Hormone that is produced by the sertoli cells and serves to control the spermatogenesis at normal rate is	Inhibin **ETEA-2016**
2932.	When the sperm count is high, inhibin	Releases
2933.	When sperm count falls, inhibin secretion secretion	Declines steeply
2934.	Inhibin inhibits anterior pituitary releases of FSH and hypothalmic release of	GnRH
2935.	**FEMALE REPRODUCTIVE SYSTEM**	
2936.	The female body prepare to nurture a developing embryo for a period of approximately	**Nine months**
2937.	**Female reproductive system consists of:** • Pair of ovaries • Oviducts • Uterus cervix • Vagina	
2938.	Ovaries are female gonads which produce ova and release	Hormone
2939.	The paired ovaries plank the uterus on each side and each ovary is held in place within the peritoneal cavity by	Several ligaments
2940.	**Some key points about ovary:**	

Shape	Almond shape
Length	3 – 5 cm
Width	2 – 3 cm

2941.	Within the ovary are sac like structures called	Ovarian follicles
2942.	Each ovarian follicle consist of an immature egg called an	Oocyte
2943.	Each month in adult woman , one of the ripening follicle eject its oocyte from the ovary, this process is called	Ovulation
2944.	After ovulation, the ruptured follicle is transformed into a glandular structures called the	Corpus luteum
2945.	Fallopian tubes or oviducts form the initial part of the female	Duct system
2946.	Fallopian tubes receive the ovulated oocyte and is the site when	Fertilizations occur
2947.	The length of the oviduct is about	10 cm long
2948.	The uterine tubes contain sheets of smooth muscles and contains both	Ciliated and non-ciliated cells
2949.	The oocyte is carried towards the uterus by the combination of the	Beating of the cilia

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	muscular peristalsis and the	
2950.	Non-ciliated cells produce secretion that keeps the oocyte and the sperm if present	Moist and nourished
2951.	The uterus is located in the pelvis, anterior to the rectum and posterior to the	Bladder
2952.	The size and shape of uterus is about of	Inverted pear
2953.	The uterus is hollow, thick-walled, muscular organ that function to receive, retain and nourished the	Fertilized ovum
2954.	**The wall of uterus is composed of three layers:** 1. Perimetrium → outermost **thin** covering layer of uterus 2. Myometrium → middle **thick** muscular layer of smooth muscles 3. Endometrium → inner spongy lining of uterine cavity	
2955.	To the layer which contract rhythmically to expel the baby out of the mother body is	Myometrium
2956.	If fertilization occur, the young embryo takes root into the endometrium(implants) and reside there for the rest of the	Development
2957.	The narrow entrance to the uterus from the vagina is	Cervix
2958.	Cervix is normally blocked by a plug of the	Mucus
2959.	The vagina is thin-walled 8 – 10 cm long tube which extends from the cervix to	Body exterior
2960.	The vagina provides a passageway for delivery of an infant and for menstrual flow, so it is also called	Birth canal
2961.	In vagina, the urethra is embedded in its	Anterior wall
2962.	The process of egg formation in females is called	Oogenesis
2963.	The required for the completion of oogenesis is	Years

Oogenesis:

2964. First, in the fetal period of oogonia, the diploid stem cells of the ovary, multiply rapidly by mitosis and then enter a growth phase and lay in **nutrient reserves.**

2965. Gradually, oogonai are transformed into primary oocytes and become surrounded by a single layer of follicle cells

2966. The primary oocyte divide the first mitotic division, but become **"stalled" late in prophase I** and do not complete it

2967. They remain in state of suspension all through childhood, the wait is a long **is 1 – 10- 14** at least

2968. At puberty a small number of oocytes are required each month

2969. Only one oocyte is selected each time to continue meiosis , ultimately producing two haploid cells that are dissimilar in size, one large and one small

2970. The large cell, that contain nearly **all the cytoplasm** of the primary oocyte, is the secondary oocytes

2971. The smaller cell is called **first polar body**

2972. In humans the secondary oocytes arrests in metaphase II and it is this cell **that is ovulated**

2973. If an ovulated secondary oocyte is not penetrated by a sperm, it is simply deteriorates but if sperm is penetration does occur, it quickly complete meiosis II, yielding **one large ovum and a tiny second polar body.**

2974. The unequal cytoplasmic divisions that occur during oogenesis ensures that a fertilized egg has ample nutrients for its **6 – 7 day** to the uterus

2975. Without nutrients contaning cytoplasm the polar bodies degenerate and die.

2976.	**MENSTRUAL CYCLE**	
2977.	The reproductive cycle in humans and other primates are called	Menstrual cycle

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2978.	The first menstrual cycle starts at	Puberty
2979.	The uterine or menstrual cycle is a series of cyclic changes that the uterine endometrium goes through each month as it responds to the	Waxing and waning of ovarian hormone in blood
2980.	The changes in ovarian cycle are controlled by the	Gonadotropins

The various phases of menstrual cycle are as follow:

1) Menstrual phase (Day 1 – 5)

2981. In this mensturation phase, the uterus sheds all but the deepest part of it is **endometrium.**
2982. The thich hormone-dependent functional layer of the endometrium detaches from the uterine wall, a process that is accompanied by **bleeding for 3-5 days**
2983. The detached tissue and blood pass out through the vagina as the **menstrual flow.**
2984. At the beginning of this stage, the ovarian hormone are at their **lowest normal level** and gonadotropins are beginning to rise, then FSH levels begin **to rise.** ETEA-2014 NMDCAT 2020 .

2) Proliferative/preovulatory phase (Day 6 – 14)

2985. Under the influence of rising blood levels of estrogen, the basal layer of endometrium generates a new functional layer.
2986. The endometrium again become velvetty, thick and well vascularized.
2987. Normally, cervical mucus is thick and sticky but rising estrogen level cause it to thin and become crystalline,forming channels that facilitates the passage of **sperm into the uterus.**
2988. Ovulation which takes place **less than five minutes**, occurs in the ovary at the end of the proliferative stage **(day 14)** in response to the sudden release of LH from the anterior pituitary.
2989. LH also converts the ruptured follicle to a **corpus luteum.**

3) Secretory/ postovulatory phase (Day 15 – 28)

2990. This 14-day phase is so important.
2991. During secretory phase, endometrium prepares for the **implantation of an embryo.**
2992. Rising level of progesterone from the corpus luteum act on the estrogen-primed endometrium, causing the arteries to elaborate and converting the functional layer to a **glandular secretory** layer.
2993. The uterine gland enlarge, coil and begin secreting the nutritious **glycogen** into the uterine cavity.
2994. If fertilization does not occur, the corpus luteum begins to degenerate toward the end of the secretory phase as **LH levels begins towards decline.**
2995. Progesterone level low downs depriving the endometrium of hormonal support and endometrial cells die setting the stage for the menstruation to begin on **day 28.**
2996. In female menstruation cycle ceases around at the **age of 50** and is termed as **menopause.**
2997. Cyclic menstruation is an indicator of **normal reproductive** life of the females.

2998.	Time span during which woman extends only from puberty to menopause, about at the age of	**50**
2999.	The 1-2% of all ovulations, more than one oocyte is	Ovulated ETEA-2014
3000.	Identical twins are the result from the fertilization of single oocyte by	Single sperm ETEA-2017
3001.	Infertility means not being able to get	Pregnant
3002.	Woman who get pregnant but are unable to stay pregnant may be	Infertile

3003. **Pregnancy is the result of a process that has many steps, to get pregnant:**
- Woman should release an egg (ovulation).
- Egg must flow to uterus

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	• Man's sperm must join with fertilized egg. • Fertilized egg must attach to inside uterus (implantation).	
3004.	Without ovulation, there are no eggs to be	Fertilized
3005.	Some signs that a woman is not ovulating normally include irregular	Or absent menstrual cycle
3006.	**DISORDERS OF REPRODUCTIVE SYSTEM**	
3007.	**Less common cause of fertility problems in woman include:** • Blocked fallopian tube due to pelvic inflammatory diseases, endometriosis. • Physical uterus with the uterus. • Uterine fibroids, which are non-cancerous clumps of tissue and muscle on the walls of the uterus.	
3008.	Infertility in men is most often caused by a problem called	Varicocele
3009.	Varicocele happens when veins of man's testes are too large this	Heats the testes
3010.	The shape and number of sperms can be affected by the	Heat
3011.	Movement of the sperm is another cause of the	Infertility
3012.	Sometimes injuries or other damage to the reproductive system	Block the sperm
3013.	Infertility is sometimes causes by the	Infertility in men
3014.	In vitro fertilization (IVF) means fertilization	Outside the body
3015.	When woman's follapian tubes are blocked or when a man produce too much sperm it cause	In vitro fertilization (IVF)
3016.	Doctors treat IVF woman with hormones that causes the ovaries to	Produce multiple eggs
3017.	Of IVF one mature egg are removed in putted in dish for	Fertilization ETEA-2015
3018.	After 3- 5 days of outside the body, healthy embryo are implanted to	Woman's uterus
3019.	A continuous loss of foetus before the 20th week of pregnancy	Called Miscarriage
3020.	Pregnancy loss after 20th week is called	Preterm deliveries
3021.	A miscarriage may be also called a	Spontaneous abortion
3022.	Miscarriage are not related to the mother or	Father's genes
3023.	The spontaneous abortion is used for occurring events which are	Natural not artificial
3024.	**Some causes of miscarriage includes:** • Drug and alcohol abuse • Exposure to environmental toxins and hormone problems • Infection, obesity and physical problems with the mother reproductive organs • Problem with the body's immune response • Serious body-wide diseases in the mother such as uncontrolled diabetes and smoking.	
3025.	The quantity of fertilized egg which die and lost spontaneously usually before woman know that she is pregnant is	Half or **50 %**
3026.	Woman who know they are pregnant, the miscarriage are about	**15.– 20 %**
3027.	Most miscarriage occurs during	**1st 7 week** of pregnancy
3028.	The termination of pregnancy by the removal or expulsion of a foetus or embryo from the uterus before it is viable	Abortion
3029.	An abortion can occur spontaneously, in this case it is called	Miscarriage
3030.	The term abortion most commonly refers to the induced abortion of	Human pregnancy
3031.	**SEXUALLY TRANSMITTED DISEASES**	
3032.	The causing agent of a gonorrhea is	*Neisseria gonorrhoeae* ETEA-2015
3033.	*Neisseria gonorrhoeae* Invades the mucosa of the reproductive and	Urinary tract
3034.	The most common symptom of gonorrhea in males is	Urtethritis

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3035.	In gonorrhea, Urtethritis accompanied by painful urination and	Discharge of pus from penis
3036.	In females symptoms of gonorrhea are ranging from	None (20%)
3037.	**The 80 % symptoms of gonorrhea in females are:** • Abdominal discomfort, vaginal discharge and abnormal uterine bleeding. • Urethral symptoms to same those seen in males.	
3038.	In woman, Gonorrhea causes pelvic inflammatory disease and	Sterility
3039.	Gonorrhea are treated by pencillin, tetracyaline and other	Antibiotics
3040.	Syphilis is caused by	*Treponema pallidum* **ETEA-2016**
3041.	Syphilis can transmitted through	Sexually
3042.	Fetuses infected with syphilis are usually stillborn or	Die shortly after birth
3043.	The bacteria of syphilis can easily penetrates intact mucosa and	Abraded skin
3044.	The incubation period of syphilis are	2 – 3 weeks **ETEA-2013**
3045.	After the incubation period the symptoms of syphilis are, a red painless primary lesion called chancre (shang'ker) appear	At the site of bacterial invasion
3046.	In syphilis the sympotoms in male appear on penis while in female it goes undetected within the vagina or on the	Cervix
3047.	If syphilis is untreated, its secondary signs appear several	Weeks later
3048.	A pink skin rash all over the body is one of the first symptom of	Syphilis
3049.	The common symptoms of Syphilis are	Fever and joint pain
3050.	In Syphilis symptoms like fever and joint pain disappears after	3 – 12 weeks **ETEA-2012**
3051.	The Syphilis enters to latent period and can only be detected by	Blood test
3052.	Latent stage of Syphilis may last a person's life or bacteria may by or Killed by immune system or it may be followed by signs of	Tertiary syphilis
3053.	Tertiary syphilis is characterized by gummas, destructive lesions of the CNS, blood vessels	Bones and skin
3054.	Treatment for all stages of syphilis is	Pencillin
3055.	The first cause of AIDs was discovered in san Francisco and New york about	20 years ago
3056.	The number of people estimated with HIV and AIDs are about	42 million
3057.	The quantity of people which die every year are	3 million **ETEA-2016**
3058.	HIV destroys a type of defense cell in the body called	CD4 helper lymphocytes **ETEA-2018** **ETEA-2019**
3059.	Still there is no cure for	HIV and AIDs
3060.	HIV can be transmitted from person to person through blood, Semen vaginal fluid and	Breast milk
3061.	Syphilis, genital herpes, gonorrhea or bacterial vaginosis are at greater risk for developing	AIDs
3062.	If mother is infected by HIV, her child can get the virus before the birth or after birth through	Breast feeding
3063.	Needles used in tattoo art can be an agent for	HIV infection

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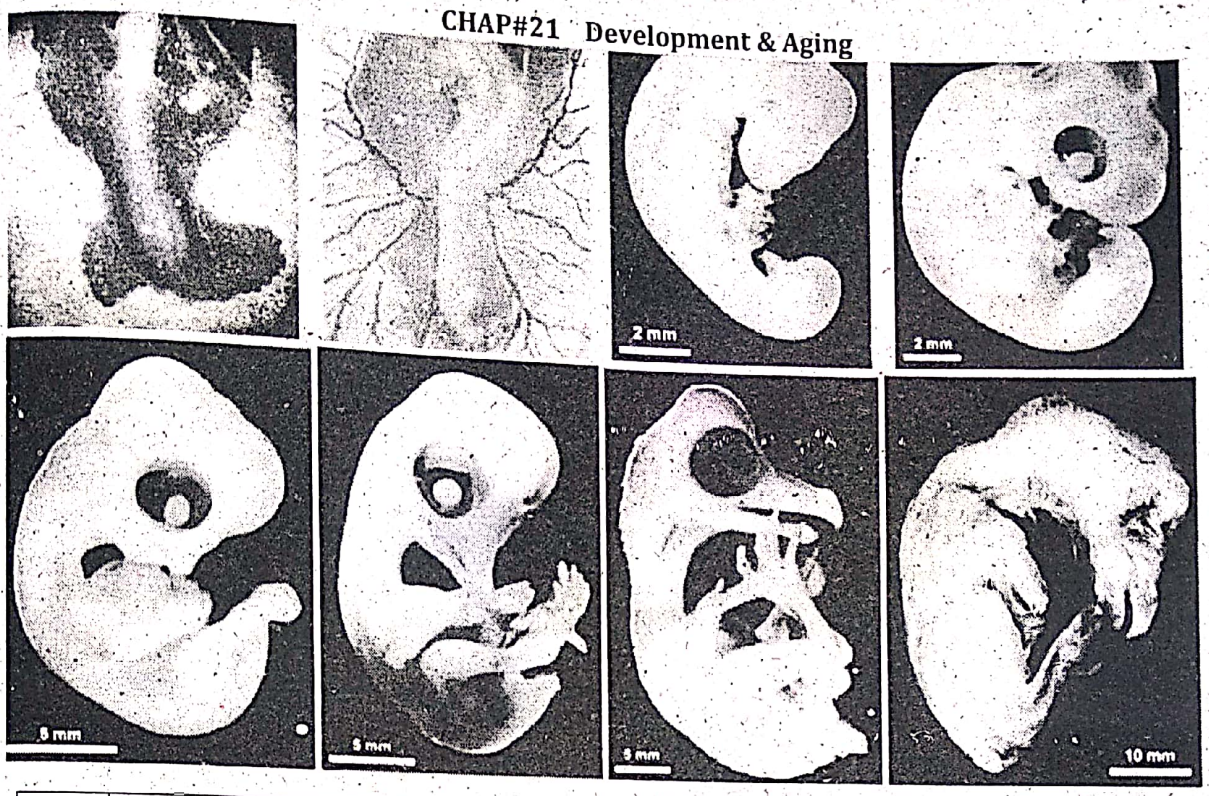
CHAP#21 Development & Aging



S.No	Questions	Answers
3064.	**EMBRYONIC DEVELOPMENT**	
3065.	In the course of life an organism changes from fertilized egg into an	Adult
3066.	The process of conversion from simpler to more complex form is called	Development
3067.	Negative development at some stages in the life cycle, which are termed as	Aging
3068.	One of the positive development is	Growth
3069.	The early divisions of zygote are called	Cleavages
3070.	A period of fairly rapid mitotic divisions of the zygote following are	Cleavage
3071.	The first two identical cells are produced called blastomeres after	First cleavage division
3072.	The first cleavage takes place after	36 hours of fertilization
3073.	The divisions in cleavage after many division produce loose collection of cells that are called	Morula
3074.	The numbers of cells which are berry-shaped in morula are	16 or more cells
3075.	After 3-4 days The embryo consist of	100 or more cells
3076.	When embryo become of 100 cells there is a process of compaction in neighboring calls are called	Compaction
3077.	The external membrane of embryo is called	Zona pellucid
3078.	The zona pellucid starts to break down and the inner structure now called a	Blastocyst "hatches" from it

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3079.	The blastocyst is a fluid filled hollow sphere composed of single layer of large, flattened cells called	Trophobalst
3080.	The inner cell mass in trophoblast consist of	20-30 rounded cells
3081.	Trophoblast cells begins to display L-selection (adhesion) molecules on their surface soon after the	Blastocyst hatching
3082.	L-selection molecules takes part in	Placenta Formation
3083.	L-selection secrete and display several factors with immunosuppressive effects that protect the trophoblast from	Mother's cells
3084.	The inner cell mass become the embryonic disk, Which forms the embryonic proper and the extra embryonic membranes except	The chorion ETEA-2012
3085.	The derivative of trophoblast is	Chorion

3086. **The extras embryonic membranes that form during the first two or three weeks of development include the:**

- The amnion → from epiblast
- The yolk sac
- Allantois
- Chorion → form by tropoblast

3087.	The amnion develops when cells of the epiblast fashion themselves into a	Transparent membranous sacs
3088.	The transparent membranous sac are filled with	Amniotic fluid
3089.	Embryonic disk curves to form tubular body, the amnion curves to it, eventually, the sac extends all the way around the embryo,broken	Only by the Umbilical cord
3090.	The two layer embryonic disk transforms into a three layer embryo	During week 3
3091.	The convertion of two layer embryo to three layer embryo is called	Gastrulation

3092. **The three layers of embryo are:** ETEA-2011-2013-2019

S.No	Layer	Tissues & Organs comes from layer
1	Ectoderm	Nervous system and Skin epidermis
2	Endoderm	Epithelial lining of the digestive, respiratory and urogenital systems and associated glands
3	Mesoderm	Everything else above

3093.	Gastrulation begins when a groove with raised edges called the	Primitive streak
3094.	The first cells to enter the groove displace the hypoblast cells of the yolk sac and form the most inferior germ layer,	The endoderm
3095.	Those that follow push laterally between the cells at the upper and lower surfaces,	Forming the mesoderm
3096.	The cells that remain on the embryo's dorsal surface are the	Ectoderm
3097.	The mesodermal cells immediately beneath primitive streak aggregate, forming a rod of mesodermal cells called	Notochord ETEA-2013
3098.	The first axial support of the embryo is	Notochord
3099.	When notochord is formed the length of the embryo is	2 mm long
3100.	The formation of organs and systems during the embryonic development are called	Organogenesis

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3101.	The first major event in organogenesis is	Neuralization ETEA-2013
3102.	The differentiation of ectoderm that produces the brain and spinal cord is called	Neuralization
3103.	The process of neuralization is induced by chemical signals from	Notochord
3104.	The superior margins of the neural folds fuse forming a neural tube	At day 22
3105.	The anterior end of the neural tube becomes the brain and the rest	Becomes the spinal cord
3106.	The cells which migrate widely and give rise to the cranial, spinal, and sympathetic ganglia and associated nerves, to the medulla of the adrenal glands and to pigment cells and contribute to some connective tissues	The associated neural crest cells
3107.	The three primary brain vesicles (fore-mid-hind) are formed at the	End of first month
3108.	All brain flexures are evident; the cerebral hemisphere cover the top of the brain at the	End of the 2nd month
3109.	The remaining ectoderm forming the embryonic body differentiates	Into epidermis of the skin
3110.	**CONTROL OF DEVELOPMENT**	
3111.	In normal development an important role is played by nucleus &	Cytoplasm
3112.	The characteristics of individual are determined by the	Nucleus
3113.	Selective genes are **"turn on"** and some are **"switch off"** by the	Cytoplasm
3114.	Importance of nucleus in development was expressed in unicellular	**Algae,** the *Acetabularia* ETEA-2017
3115.	*Acetabularia* are found in European seawater and its length is	2 – 3 inches
3116.	**The two species of *Acetabularia* are different in the shape of their head:**	

Species	Head shape
Acetabularia meditterranea	Umbrella
Acetabularia crenulata	Irregular ETEA-2019

3117.	When the stacks of *Acetabularia* fungi are interchanged the new head structure will according to the	Type of nucleus at base
3118.	The nucleus exerts a strong influence on the development of cap	Through the mRNA
3119.	Different cytoplasmic components certain different morphogenetic determinant that are responsible for	Cell differentiation
3120.	The cytoplasmic director of cell destiny is the	Gray crescent
3121.	**Fertilized egg of an ascidian contains cytoplasm of four different colours that are segregated into different blastomeres:**	

S.No	Cytoplasm type	Produce/give rise to
1	Clear	Larval epidermis
2	Yellow	Muscle cells
3	Gray vegetal	Gut
4	Gray equatorial	Notochord and neural tube

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3122.	**Mechanism of cellular determination:** • Asymmetric segregation of cellular determinants • Inductive signaling between cells	
3123.	**There are three main ways by which signals can be passed between cells:** 1. A signal is sent to extracellular fluid and is received by cell receptor of other cell which are further transmits by second messengers. 2. Cell directly contact each other through transmembrane proteins located on their surfaces. 3. Signals are passed by the gap junction between of two cytoplasm cells	
3124.	The German zoologists Hans Spemann and Halide Mangold discovered in an early gastrula an extremely important morphogenetic field with amazing properties in	1920s
3125.	Through technically difficult because the gastrulas were only about	2 nm
3126.	**The result was clear because the research uses two related species of newts:** 1. Triton taeniatus → pigmented → tissue donor 2. Triton cristatus → non pigmented → host embryo **ETEA-2016**	
3127.	By transplanting pigmented tissue from donor to host embryo, Spemann and Mangold get result that secondary notochord and neural tube were composed in large part of	Host (non-pigmented) cells with some pigmented cells remains
3128.	The transplanted tissue are named as	Organizer
3129.	The organizer secretes	Morphogens
3130.	**HUMAN EMBRYONIC DEVELOPMENT**	
3131.	**Each three month period of pregnancy is called Trimester.** 1. Fetal development: The first trimester: weak 1 – 12. 2. Foetal development: The second trimester: weak 13 – 24 3. Foetal development: The third trimester: weak 24-36	
3132.	During each trimesters the fetus	Grows and develop
3133.	When zygote divide to clusters of cell, the inner cell becomes the embryo and the outer cell becomes the	Membranes that nourish the embryo
3134.	In pregnancy the implantation takes place at	Fourth weak **ETEA-2016-2017**
3135.	The baby's brain, spinal cord, heart and other organs begin to form	At 5th week of pregnancy
3136.	The beginning of embryonic period is marked by	5th week of pregnancy
3137.	To the end of first trimester the embryo can now be called a	Foetus **ETEA-2019**
3138.	A developing fingernails and face has a human profile in a	Foetus
3139.	A pregnancy in which embryo implants in any other side than the uterus, most often in the uterine tube is called	Ectopic pregnancy **ETEA-2015**
3140.	During the second trimester, the foetal sex becomes apparent and possibly identified during an	Ultrasound
3141.	In second trimester the foetal ear begins to stand out at the side of head and allow the foetus	To hear the sound
3142.	The head is about half of the overall size of foetus in	Second trimester
3143.	The foetus grown rapidly at fifth month and internal organs continue	To mature

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3144.	In second trimester, hairs starts to appear and	Finger prints developed
3145.	In third trimester the weight gain is	28 g per day
3146.	The foetus begins to move rapidly and woman can felt it, this is	Third trimester
3147.	The fetal head descend into pelvic cavity by	Third trimester
3148.	38 or 40 weeks into pregnancy, baby weight might by **18-20 inches**	And weight is **6-9 pound**
3149.	Apregnancy of two or more fetuses is called a	Multiple fetuses
3150.	Multiple fetuses are same called identicle and or different called	Fraternal
3151.	Identical twins or triplets come from a	Single egg fertilization **ETEA-2016**
3152.	Fraternal multiples come from	Multiple fertilized eggs **ETEA-2015**
3153.	Some cells of the embryo grow into disk like structures called	Placenta
3154.	The placenta attached to the embryo by a tube called	Umbilical cord
3155.	The blood vessels of the placenta are close to those of	Uterus
3156.	A few weeks before the birth, the head of the fetus is turned down	Just above the cervix
3157.	Childbirth begins when the muscular layers of the uterus start to	Contract and relax
3158.	The contraction and relaxation of muscular layer are felt as	Labour pains
3159.	Head of the baby act as a wedge to assist	Cervical dilation
3160.	The amniotic sac breaks at some stage in labour and the	Fluid escape
3161.	Baby is pushed through vagina and now called	Birth canal
3162.	After birth the umbilical cord is	Cut and tied
3163.	The sudden fall in temperature felt by the newly born baby stimulate	It to take 1st breath
3164.	In a few days, the remains of the umbilical cord attached to the baby's abdomen shrivel and fall away, leaving a scare in the	Abdominal wall, called the navel
3165.	The mammary gland of mother produce milk at the	End of pregnancy
3166.	The milk produced initially by the mammary glands contains special lymph like fluid called	Colostrum **ETEA-2013**
3167.	Colostrum is much rich in	Antibodies
3168.	Usually, the baby is fed on the maternal milk for upto	Two years
3169.	As soon as mother stops feeding the baby, her reproductive cycle	Begins again
3170.	**Advantages of breast feeding:** the breast milk; 1. Contain perfect balance of nutrients 2. Are easily digestible 3. Have optimum temperature 4. Available at any time and any place **Advantages of bottle feeding:** Presence of mother is not necessary.	
3171.	**Disadvantages of bottle feeding:** the bottle milk; 1. Can create unhygienic circumstances for the baby 2. Can carry an infection 3. Can cause indigestion	

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4. Can cause stomach disorders
5. Are not efficiently utilized
6. Can cause infection with particular formula

3172. **DISORDERS DURING EMBRYONIC DEVELOPMENT**

3173.

Diseases	Causes
Rubella	Rubella virus
Neural tube defect	Incomplete development of the brain, spinal cord or their protective covering

3174.	Rubella are commonly known as	German measles **ETEA-2018**
3175.	If mother is infected by rubella within the first 20 weeks of pregnancy, the child may be born with	Congenital rubella syndrome (CRS)
3176.	The syndrome (CRS) follows intrauterine infection by Rubella virus and comprises of defects of	Cardiac, cerebral, ophthalmic and auditory
3177.	The CRS may also cause prematurity, low birth weight and	Anemia and hepatitis
3178.	Abnormal neural tube occurs when the foetus' spine fails to close properly during early stage of	Pregnancy
3179.	In newborn infants with congenintal hypothoiridism frequently have	Hyperbilirubinemia
3180.	In first trimester the miscarriages are due to a chromosome abnormality in the foetus and this is about	50 %
3181.	An extra chromosome or a missing chromosome can cause miscarriage usually in the usually in the 1st and 2nd trimester and can lead with a children with	Learning difficulties and mental retardation
3182.	Chromosomes abnormalities involving missing or extra chromosomes are not inherited or caused by	An exposure
3183.	Missing or extra chromosome are caused by chance mistake in cell division soon after the	Time of conception
3184.	Chance mistake error a random event that can occur in	Anyone's pregnancy
3185.	An inherited problem with the chromosomes can also cause	Miscarriage
3186.	Parent have their rearrangement of their chromosomes called	Translocation
3187.	Another genetic cause of miscarriage is a change in a single/several	Gene on chromosome
3188.	Most effects are best treated	After birth
3189.	Prerequisites for fetal surgery include the selection of those fetuses who might be benefit from intrauterine treatment and a highly	Experienced Multidisciplinary team

3190. **A highly experienced multidisciplinary team includes a:**
- Perinatal obstetrician
- An ultrasonographer
- A pediatric surgeon
- A neonatologist

3191. **In human beings intrauterine treatment has been performed in the:**
- Erythroblastosis
- Foetalis
- Urinary tract obstruction with encouraging results

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3192.	**POSTNATAL DEVELOPMENT**	
3193.	The term allometric growth means	Differential growth
3194.	Not all parts of the organism developed at the same rate	Allometric growth
3195.	**AGING**	
3196.	The legs of the foetal and newborn baby are Short,	Chubby and ineffectual
3197.	The adult height accumulated by the leg length is	Half
3198.	Physiological changes that occur in all individuals due to age are	Aging
3199.	Age related changes are impacted by both	Genetic & environment
3200.	Loss of function reserves impairs an individual's ability to cope with physiological challenges such as	Anaesthesia and surgery
3201.	Individual of the same chronological age may differ significantly in the rate and	Severity of functional decline
3202.	Person who maintain greater than average functional capacity are	Physiological young
3203.	Persons whose function declines at an earlier age appear to be	Physiological old
3204.	**Signs and symptoms of aging:** 1. Overall decrease in energy and vigour 2. Change in sleeping patterns 3. Skin hair changes such as wrinkles, brown spots on the skin, loss of skin elasticity, and hair loss 4. Decrease in hearing 5. Decrease in vision 6. Sexual dysfunction 7. Urinary problems such as • Incontinence • Dribbling • Change in frequency of urination 8. Change in menstural cycle 9. Abdominal obesity 10. Inability to weight loss	
3205.	Secondary aging processes result from diseases and	Poor health practices
3206.	No exercise, smoking, excess fat and other form of self damage are	Poor health practices
3207.	**Cell level changing in aging:** • All cell changes as age • Cell become larger • Capacity and reproduction property of cell decrease • Ability of cell to repair decline • DNA is damaged through aging process and changes occur in 1. Cellular membrane 2. Enzymes 3. Transport of ions and nutrients 4. Nucleus chromosome changes such as clumping, shrinkage and fragmentation 5. Lysosome and mitochondria numbers are reduced causing cell to function less efficiently, it also decrease hormonal secretion	
3208.	**A decrease in metabolism has several effects;**	

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	• Toleration of cold is less • A tendency to gain weight in increases • Decreased efficiency in the body's use of glucose • Collagen and elastin decreases in connective tissue formation • Lipid and fat content of tissue changes • Total amount of water in the body gradually decreases
3209.	**System changes in aging:** 1. The GI tract maintains its functional level well in old age except of three areas; • Altered taste decreased stomach acid • Decrease blood flow to the liver • Decrease in saliva that affect chewing and swallowing 2. Osteopenia and osteoporosis both deal with bone loss, the difference is the degree of loss. 3. Age 30-40, men and women start to lose bone mass and enter a condition called osteopenia, a decreased or lower mineral content of the bone 4. Osteoporosis is then greater degree of osteopenia and involves decrease in bone mineral and bone matrix 5. Usually aging is accompanied by a lower production of **neurotransmitters,** but only when the drop approaches 50% will dementia ensures. 6. About 15% of the elderly have a severe dementia 7. The heart of the elderly person could be • Smaller than normal due to malnutrition • larger due to severe high blood pressure • unchanged in size 8. Aging cause the left ventricle wall to thicken and diameter and length of aorta increase 9. Fat will accumulate in the heart muscle as a response an increase in total body weight 10. Infection occurs more frequently in the elderly and are more often serves due to low degree working of immune system

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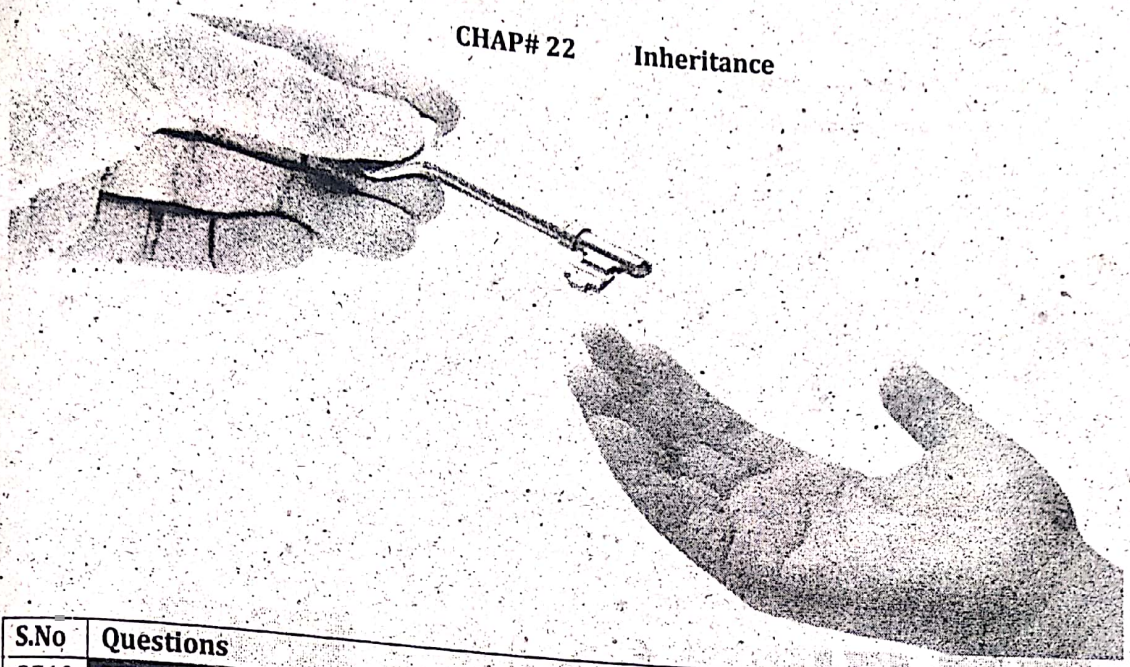
CHAP# 22 Inheritance



S.No	Questions	Answers
3210.	**MENDEL'S LAW OF INHERITANCE**	
3211.	The tendency of individuals to resemble their parents are called	Heredity **ETEA-2018**
3212.	The difference between offspring and their parents are called	Variation
3213.	Heredity and variation play important role in the formation of	New species
3214.	The science which deals with the study of heredity and variation	Genetics
3215.	Genetics are also referred to the study of	Genes
3216.	The science of genetics originated in the year 1900 with the rediscovery of an article originally published in 1866 by an	Augustinian monk named Gregor john Mendel
3217.	The one who successfully explained the mechanism of inheritance during his research work on pea plant was	Mendel
3218.	Mendel was an Austrian monk and is properly known is	Father of genetics
3219.	Mendel was born on July 22, 1822 in	Czech Republic
3220.	Between 1856 and 1863 Mendel carefully analyzing the seven pairs of seed and plant characteristic and cultivated and tested about	28,000 pea plants
3221.	Mendel first delivered his lecture on pea plants in the year of	1865
3222.	Mendel published hi paper "Experiments on plants hybridization" in	1866
3223.	**Later on in 1900, Mendel work was recognized by three investigators:** 1. A Dutch botanist Hugo de Vries 2. De Correns of Germany 3. Tschmarck of Austria	
3224.	The Darwin's theory of evolution was appeared in the year of	1859
3225.	The journal in which Mendel work was republished was	Not recognized

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3226.	The scientist of Mendel era was not familiar with the	Statistical analysis of data
3227.	**The main characteristics of plant plants are as follow;** • can be grown in pots or in open area • Short life cycle • Self-pollinating flowers • Cross pollination is possible • Possesses distinct contrasting heritable characters	
3228.	**Mendel choose seven characters of pea plants for his experiments given below;**	

S.No	Character	Dominant trait	Recessive trait
1	Seed shape	Spherical	Wrinkled
2	Seed colour	Yellow	Green
3	Pod shape	Inflated	Constricted
4	Pod colour	Green	Yellow
5	Flower position	Axial	Terminal
6	Flower colour	Purple	White
7	Stem height	Tall	short

3229.	A cross between two individuals that differ with one particular trait is called	Monohybrid cross
3230.	The character that appeared in F_1 generation are called	Dominant character
3231.	The hidden character that appear in F_2 generation are called	Recessive trait
3232.	The offspring of F_1 generation of true red round seed shape plant with true bred wrinkled seed shape will	All round seed shape
3233.	Mendel observed that the recessive character appeared in the F_2 offspring in an average ratio of	3 : 1
3234.	During Mendel's time the study of cytology was in its	Primitive stage
3235.	Mendel visualized the cause of inheritance as	Factors or elements
3236.	Factors/elements was named by Johannsen in 1909 as	Genes
3237.	According to Mendel, each male and female contain a pair of factors and they passed to its offspring only	One factor
3238.	**Mendel's work could be represented by laws of heredity. These laws are:** • Law of dominance • Law of segregation • Law of independent assortment	
3239.	Dominant allele is represented by	Capital letter
3240.	The recessive allele is represented by	Small letter
3241.	The condition of albinism is characterized by the lack of	Melanin pigment
3242.	Lack of melanin pigment occurs in the	Hair, eyes and skin
3243.	Out of two phenotype the more common is called	Wild phenotype
3244.	The rare form of phenotype is called	Mutant phenotype
3245.	The symbol used to indicate normal allele for wildlife is	+
3246.	According to the law of dominance, different characters are controlled by the	Factors
3247.	Factors are present in pairs, of which one factor	Is dominated over other
3248.	The offspring of two organisms that are particularly different for	Dihybrid

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	two traits are called	
3249.	The fundamental law of genetics is called law of	Independent assortment
3250.	The offspring of the RRYY x rryy were all heterozygous with	Round yellow seeds
3251.	**Mendel crossed RrYy x RrYy and the result was**	

Round yellow	Round green	Wrinkled yellow	Wrinkled green
9	3	3	1

3252.	Two pairs of contrasting traits when followed in a cross, the alleles of one pair assort independently with the alleles of the other pair	Law of independent assortment **NMDCAT-2020**
3253.	Independent assortment of gene was studied by Mendel in	1865
3254.	Independent assortment of gene occurs during	Meiosis in eukaryotes
3255.	After meiosis occur, each haploid cell contains a mixture of gene from the organism's	Mother and father
3256.	Independents event will occurs simultaneously is the product of their individual probabilities	Product rule
3257.	Probability of an event that can occur in two or more independent ways is the sum of the separate probabilities of the different ways	Sum rule
3258.	If male plant is Pp and female plant is Pp, the probability of heterozygous plant are • product rule → ¼ • Sum rule → ½	
3259.	**EXCEPTION TO MENDELIAN INHERITANCE**	
3260.	**Dominance relation are of the following types:** • Complete dominance → tall;short • Incomplete dominance → 4'o clock plant flower • Co-dominance → blood group AB • Over-dominance → eye colour **ETEA-2018**	
3261.	When one allele is completely dominant over another in heterozygous state is called	Complete dominance **NMDCAT-2020**
3262.	When neither of the two alleles express independently in heterozygous state is called	Incomplete dominance
3263.	Cross of true breeding red flowered plant with a true breeding white flowered of 4' o clock plant, all the hybrid orbitals are	Pink colour
3264.	**When Corren crossed two pink flowers the result was:**	

Red flower	Pink flower	White flower
1	2	1

3265.	When different alleles of a genes that are both expressed in a hetrozygote condition are called	Co—dominance (blood group)
3266.	When phenotypic expression of heterozygote become more intense than the homozygous state of the dominant allele are called	Over dominance
3267.	Allele which code for one possible outcome of a phenotype are called	Gene
3268.	**ABO BLOOD GROUP SYSTEM**	
3269.	Blood group system was discovered at the university of the Karl	1901

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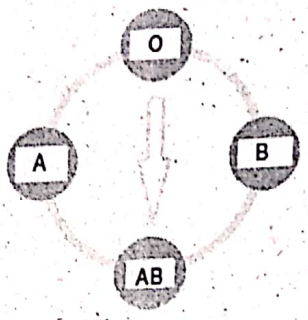
	Landsteiner in	
3270.	ABO blodd group system was found in the humans and apes, chimpanzees, baboons and	Gorillas

3271. **ABO blood group systems:**

Blood group type	Antigen	Antibodies	Donors
A	A	B	A, O
B	B	A	B, O
AB	AB	None	A, B, AB, O
O	None	A,B	O

3272. O blodd group people are universal donors for transfusions



3273.	The genetic basis of ABO system in 1925 was discovered by	Bernstein
3274.	ABO blood group system is encoded by the single polymorphic gene "I" on	Chromosomes 9

3275. **Gene "I" exist in three multiple alleles:**
1. I^A
2. I^B
3. i

- I^A and I^B are completely dominant over i.
- I^A and I^B are co-dominant over each other.

3276.

ABO blood type	Genotype
A	$I^A I^A$, I^A i
B	$I^B I^B$, I^B i
AB	$I^A I^B$
A	ii

3277.	The **main** typs of blood group types	2
3278.	The **major** types of blood group systems are	30
3279.	The **minor** blood group systems(rare blood types) are	More than 200

3280. **Two main blood group system are:**
1. ABO system
2. Rh(Rhesus) system

3281.

Rh blood type	Rh factor or Antigen	Anti Rh antibodis	Donors	Genotypes
Rh^+	Present	Absent	Rh^+ / Rh^-	DD / Dd
Rh^-	Absent	Present	Only Rh	dd

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3282.	**Rh BLOOD GROUP SYSTEM**	
3283.	The antigen of Rh was discovered in the Rhesus monkey by	Landsteiner in 1930s
3284.	The Rh blood group system currently consist of	50 defined blood groups
3285.	The more common of Rhesus blood groups are	D, C, c, E & e
3286.	The commonly-used terms Rh factor, Rh positive and Rh negative refer to the	D antigen only
3287.	ABO blood type antigens are also secreted by some people in their body fluids including	Saliva, tears and urine
3288.	People which secrete ABO blood type antigens are called	Secretors
3289.	ABO blood group system are controlled by a dominant secretor gene	"Se" on chromosomes 19
3290.	Rh blood group system is encode by three genes C, D & E which occupy	2 tightly linked loci
3291.	Formation of D antigen is commonly known as	Rh factor
3292.	Gene D has two alleles D and d. → Person having genotype "DD" or "Dd" have D antigen (Rh factor) on their RBC and are Rh positive. →person having genotype "dd" do not have Rh factor and are Rh negative.	
3293.	The mother immunity destroy the red blood cells of an Rh-positive foetus, it is called	Erythroblastosis foetalis
3294.	A type of red blood cell which still retains a cell nucleus, it is the immediate precursor of a normal erythrocyte	An erythroblast
3295.	The interaction between the alleles of different pair located on different loci of same or different chromosomes are called	Non-allelic interactions or inter-genic interaction
3296.	**GENE INTERACTIONS**	
3297.	An example of non-allelic interaction is	Epistasis **ETEA-2007**
3298.	The phenomenon in which the effect caused by one gene at one locus interferes with or hides the effect caused by another gene at another locus	Epistasis
3299.	The gene which is suppressed is called	Hypostatic gene
3300.	The gene which is dominant is called	Epistatic gene
3301.	The relation between alleles of same gene on same locus	Dominance
3302.	The interaction between different gene of different loci	Epistasis
3303.	When individual are phenotypically O but genotypically they may be like A, B or AB, this is	Bombay Phenotype **ETEA-2015**
3304.	The Bombay phenotype was first discovered in in 1952 by	Dr. Y.M Bhende
3305.	Bombay phenotype is present about	**0.0004%** (4 per million)
3306.	The maximum possibility of Bombay phenotype is	**0.01%** (1 in 10,000)
3307.	To produce phenotype, genotype interact with	Environment
3308.	Qualitative traits have few phenotypes that have sharp difference so they show	Discontinuous variation
3309.	Quantitative traits comparatively have large number of phenotype small difference so they show	Continuous variation
3310.	**Qualitative traits:**	

S.No	Organism/Part	No of phenotypes	Phenotypes
1	Pea seed shape	2	Round & wrinkled

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2	4' O clock flower	3	Red, Pink & Water
3	ABO blood group system	4	A, B, AB & O

Quantitative traits (polygenic traits/multiple gene):

1. Height
2. Weight
3. Intelligence
4. Skin colour
5. Wheat grain colour

3311.	All the genes that control quantitative traits are called	Poly genes
3312.	Number of population of all phenotypes of wheat population are	7
3313.	Most grain have shades in between from	Light pink to moderately dark red
3314.	When red green grain is crossed with true breeding white grain the	Result was light red colour
3315.	Three different gene pairs, Aa, Bb, Cc at three different loci contribute to the	Wheat grain colour

3316.

Colour	F_2 generation		No of red pigment
Dark red	1	AABBCC	6
Moderately dark red	6	AaBBCC, AABbCC, AABBCc	5
Red	15	AABBcc, AAbbCC, AAbbCC	4
Light red	20	AaBbCc, AABbcc,aaBbCC	3
Pink	15	AaBbcc, AabbCc, aaBbCc	2
Light pink	6	Aabbcc, aaBbcc, aabbCc	1
White	1	aabbcc	0

3317.	Alleles A,B and C codes for an equal amount (dose) of	Red pigment
3318.	Environmental factors that can influence the amount of grain colour	Light, water & nutrients

3319. Skin colour is largely determined by the Melanin the skin produce. At least three genes regulate the amount of melanin produced;

Gene A	Involved in permanent survival, proliferation and migration of melanocytes.
Gene B	Encodes the enzyme tryosinase which is involved in the production of melanin from tyrosine.
Gene C	Primarily responsible for determining whether pheomelanin or eumelanin is produced in humans.

3320. **Different shades of skin colour:**

Alleles colour shades	Pigment	Ratio
Dark brown	6	1
Moderate dark brown	5	6
Brown	4	15
Light brown	3	20
Pinkish brown	2	15
White brown	1	6

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	Pure white	0	1

*Total combinations: 64

3321.	**GENE LINKAGE AND CROSSING OVER**	
3322.	The number of gene is greater than number of	Chromosomes
3323.	Gene located on same chromosomes that tend to be inherited together in genetic crosses are said to be	Linked genes
3324.	The phenomenon of staying together of more than gene on the same chromosomes are called	Gene linkage
3325.	If gene are linked on autosomes, their linkage are called	Autosomal linkage
3326.	If gene are linked on sex chromosomes, they are called	Sex linkage
3327.	All the linked gene found on the same homologous pair of chromosome form a group, known as	Linkage group
3328.	In humans, the sickle cell anemia, leukemia and albinism are found on	Chromosomes 11
3329.	The linked genes tend to be inherited together and this is	En *bloc* inheritance

3330. **Detection of gene linkage:**

Heterozygous individual(F_1) is crossed with recessive parent(P_1), then if

- If all phenotype are produced in equal (1:1:1:1) then there is no linkage between genes.
- If more parental and less recombinant are produced then it is incomplete or partial linkage.
- If only parental types are produced then tight or complete linkage is believed.

3331. **T.H Morgan experiment:**

→ Normal is dominant over vestigial and gray is dominant over black.

Body	Wings	Type	Numbers
Gray	Normal	Parental	965
Black	Vestigial	Parental	944
Gray	Vestigial	Recombinant	216
Black	Normal	Recombinant	185

So it is incomplete or partial linkage.

3332.	The process which is responsible for gene recombination of linked gene is	Crossing over

3333. **Recombinant frequency % = sum of recombinants / sum of combination(parental + Maternal) x 100**

3334.	The gene that affect the eye colour of drosophila is	Cinnabar (cn)

3335.

b-------cn----------vg

Distance between:

- b and vg → 17%
- b and cn → 9%
- cn and vg → 9.5%

3336.	The map units are	Arbitrary
3337.	One map unit is supposed to equal to	1% recombination frequence
3338.	Relationship between allele of the same gene occupying same locus	Dominance
3339.	The interaction between different gene occupying different loci	Epistasis

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3340. **SEX DETERMINATION**

3341. **There are wide variety of sex determining mechanisms but three patterns are more common which are:**

Type	Found in
XO-XX	Grasshopper and protenor bug
XY-XX	Drosophila and humans ETEA-2016
XX-XY / WZ-ZZ	Birds, butterflies and moths ETEA-2017

3342.	A trait whose gene is present on X-chromosomes are called	X-linked trait
3343.	A gemmate without any sex chromosomes are called	Nullo gamete
3344.	A gene which is present on X-chromosomes with no counter part on Y-chromosomes are called	X-linked genes

3345. **Comparison of determination of sex chromosomes of drosophila and human:**

Species	Humans	Drosophila
XX	Female	Female
XY	Male	Male
XO	Sterile Female	Sterile Male
XXY	Sterile Male	Fertile Female ETEA-2018

3346.	An X:A ratio of 1.00 or high produces	Females
3347.	X:A ratio of 0.5 or lower produces of	Males
3348.	**SEX LINKAGE**	
3349.	Morgan showed that the inheritance of eye colour and sex occur in	Coordinate fashion
3350.	SRY genes on Y chromosomes of man determines	Maleness
3351.	Sons do not inherit their father	X chromosomes

3352.

X linked recessive disorders NMDCAT-2020	X-linked dominant disorders ETEA-2010-2013
Haemophilia A and B	Alport's syndrome
Colour blindness	Coffin – Lowry syndrome (CLS)
Diabetes insipidus	Idiopathic hypoparathyroidism
	Vitamin D resistant rickets

3353.	Y-linked inheritance is also known as	Holandric inheritance
3354.	Chromosomes Y deletion are frequent genetic cause of a	Male infertility
3355.	In haemophilia the individual are less able to cause	Blood clot
3356.	A chance that a man will inherit the colour blind trait from a carrier mother is	50%

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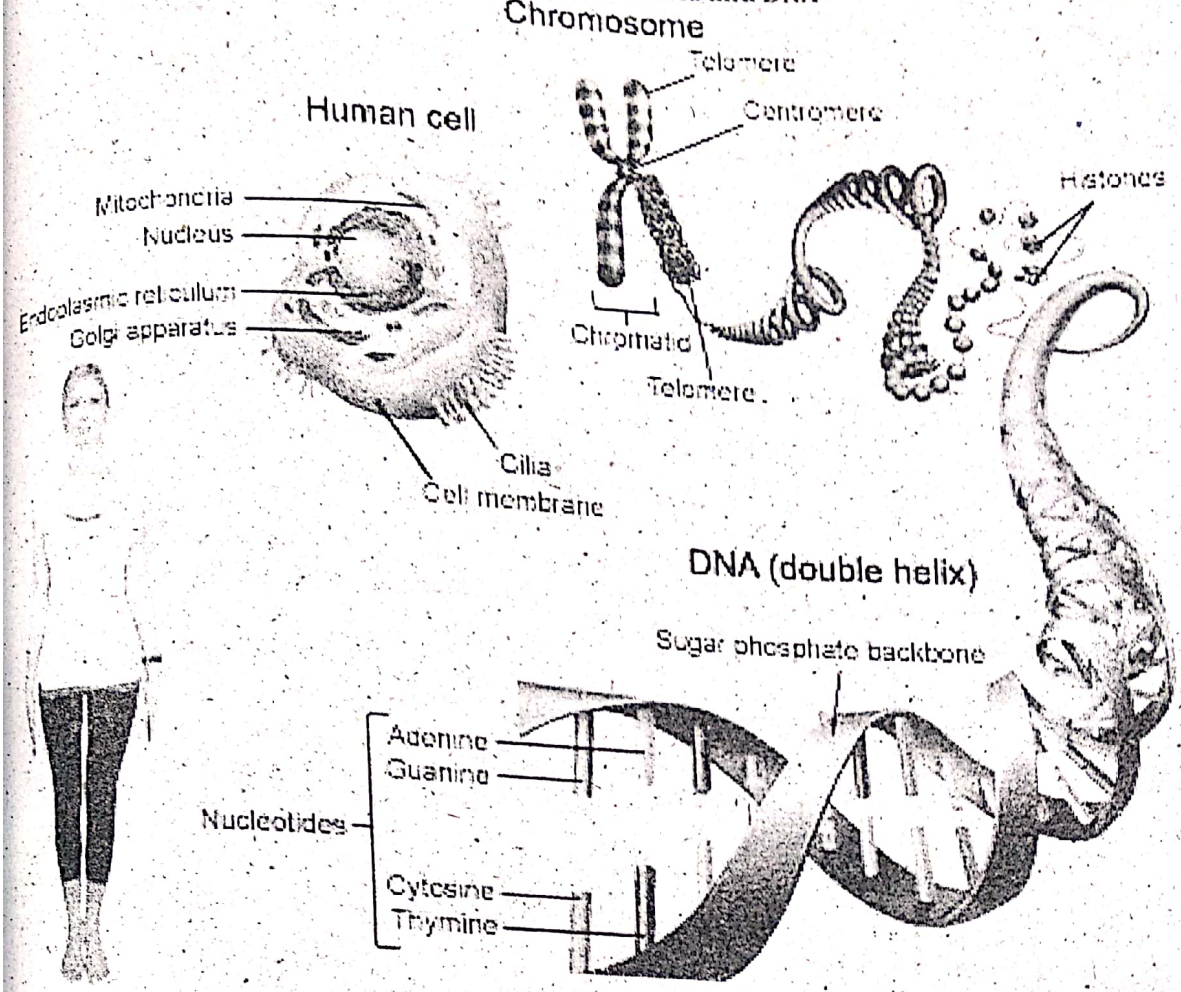
CHAP# 23 Chromosomes and DNA



S.No	Questions	Answers
3357.	**CHROMOSOMES**	
3358.	Gregor Mendel's "heredity factors" were purely an abstract concept when he proposed their existence in	1865
3359.	Mendel's factor are located along the	Chromosomes
3360.	The location of particular gene by tagging chromosomes with a florescent that	Highlight the gene
3361.	Chromosomes are thick thread like structures that appear in nucleus	During cell division
3362.	In an interphase cell chromosomes become uncondensed and look like very fine network called	Chromatin network
3363.	Chromosomes are first observed in 1882 by German embryologist	Walther Fleming
3364.	Chromosomes was first seen in	Salamander larvae
3365.	The term chromosomes was proposed by Waldeyer and literally means	Coloured bodies
3366.	In prokaryotes the single DNA molecule is referred as	Chromosomes
3367.	Number of chromosomes exactly half than the somatic number of chromosomes are referred is	Haploid
3368.	Many species has two sets of chromosomes hence called	Diploid

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3369.	Many species have more than two sets of chromosomes which are	Polyploids
3370.	**Polyploids may be:** • Tetraploid • Hexaploid	
3371.	Gametes and spores are usually	Haploid cells
3372.	**A haploid cell may be:** • Monoploid → one set • Diploid → two sets • Triploid → three sets	
3373.		

Species	Somatic number	Haploid	Monoploid (n)
Human	46 (2n)	23 (n)	23
Wheat	42 (6n)	21 (n)	7

3374.	A typical chromosomes consists of two sets of chromosomes called	Chromatids
3375.	Each chromatid is made of a long DNA molecule which is highly coiled with	Histone Proteins
3376.	Both chromatids are attached with each other at a point known as	Centromere/ Primary constriction
3377.	Some chromosomes have another point of union along the length of chromatids, called	Secondary constriction/ Nucleolar organizer
3378.	Beside secondary constriction the end become the knob like structure called	Satellite **ETEA-2012**
3379.	Satellite region has useless sequences of DNA called	Junk DNA
3380.	The terminal end of chromosomes are called	Telomeres
3381.	The two chromosomes are prevented from attaching with each other by	Telomeres
3382.	**On the basis of position of centromere along the length, a chromosomes may be called:** • Metacentric → centromere at center • Submetacentric → centromere slightly away from center • Acrocentric → centromere located near end • Tolecentric → centromere located at an end ***center → away from center → near end → at end***	
3383.	**Generally chromosomes are made of:** • DNA (40%) • Proteins (60%)	
3384.	Each chromatid has	One DNA molecule
3385.	An average size of human chromosomes are	5 cm long
3386.	The number of nucleotides in DNA are about	140 million
3387.	DNA has negatively charge due to	Phosphate group
3388.	Histone proteins are positively charge due to some amino acids like	Arginine and lysine
3389.	**There are five types of Histone Proteins:** 1. H_1 2. H_2A 3. H_2B 4. H_3 5. H_4	

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3390.	During S phase of cell cycle DNA and histone are completely	Disorganized
3391.	The organization of chromosomes occur in four levels;	

S.No	Level	Thickness and diameter
1	DNA	2 nm thick
2	Nucleosome string	10 nm thick ETEA-2005
3	Chromatin fiber/ solenoid	30 nm thick
4	Super coil	200 nm diameter
5	Chromatid	700 nm diameter

3392.	200 nucleotides wrap twice around the core of histone proteins forming	Nucleosome
3393.	Two of each H_2 A, H_2 B, H_3 and H_4 are eight proteins from which	DNA wrap twice
3394.	A small segment of DNA(linker DNA) between two every nucleosome	H_1
3395.	The whole DNA is converted into bread like appearance by	Linker histone protein
3396.	During G_1 and G_2 phase chromosomes are found in the form of	Chromatin fiber/Solenoid

CONCEPT OF GENE

3398. **The chromatin fiber show two regions:**

- Heterochromatin →highly condensed → unexpressed region ETEA-2015
- Euchromatin →non- condensed → expressed region

3399. **Historical background of genes:**

- Charles Darwin first conceived idea of heredity units when he published his theory of pengenesis in 1868. In this model the circulating unit was **Gemmules.**
- In the 1890s Hugo De Vries took the term "pangenesis" and transmitted it to **"pangene"** for the units of inheritance.
- William Johansson introduced the term **"gene"** to replace several contending and misleading terms for the basis unit of heredity in 1909. ETEA-2012
- The term **"genetics"** came earlier, when William Betson coined the word in 1906 to represent the new field that studied heredity, variation and evolution.

3400.	The theory of Darwin was experimentally discredited by	Francis Galton
3401.	Modern concept of gene was given by Mendel on his experiment on	Pea plant
3402.	According to Mendel, each trait in the pea plant is controlled by the discrete units, what he referred as elements or factors	Modern concept of gene
3403.	In modern terminology the Mendel factors are called	Gene
3404.	A gene is composed of nucleotide sequence of a short segment of DNA which encodes the sequence of amino acids of a	Particular polypeptide
3405.	The position of gene where gene is located are called	Locus
3406.	Most gene exists in more than one form called	Alleles
3407.	The alleles are due to difference at one or more nucleotide	Position on DNA
3408.	The alleles related to same trait are present on the	Same locus
3409.	The gene of ABO blood group is "*I*" and it has three allele which are	I^A, I^B and *i*
3410.	The three alleles of Blood group gene are present on the	Chromosome 9

3411. **Regions of genes:**

- Regulatory region
  1. Promoter → 5' ends
  2. Terminator → 3' ends
- Structural region

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	1. Introns → non-functional **ETEA-2016** 2. Exons → functional	
3412.	The regulatory region located at the end 5' end of coding strand of a gene is called	Promoter
3413.	Promoter controls the binding RNA polymerases during	Transcription
3414.	Terminator region is located to the 3' end of	Coding strand of gene
3415.	The terminator region causes RNA polymerases to	Stop transcription
3416.	The region between promoter and terminator region is called	Structural region
3417.	Structural region comprises information(genetic code) for a particular polypeptide or	Functional RNA
3418.	In eukaryotic gene the information of structural region is interrupted by a non-functional sequence called	Introns
3419.	The functional sequence of terminator is called	Exons
3420.	There is no such pattern of introns and exons is called	Prokaryotic DNA **ETEA-2012**
3421.	In prokaryotes many adjacent structural region produce different polypeptides by some promoter and terminator region and are	Called Operon
3422.	**CHROMOSOME THEORY OF INHERITANCE**	
3423.	Chromosomes are unit of heredity, this was first forwarded by	Karl Correns in 1900
3424.	Behavior of Mendel's factors(gene) are parallel to behavior of chromosomes at meiosis, this idea was recognized in 1902 by; • Walter Sutton → An American graduate student. • Theodor Boveri → A German biologist	
3425.	Objection on Sutton's theory was cleared by discovery of T.H Morgan in 1910 on	*Drosphila*
3426.	Parallel behavior of gene and chromosomes in meiosis;	

S.No	Chromosomes behavior	Gene behavior
1	Diploid cells have two copies of each chromosomes	Diploid cells have two copies of each genes
2	Gametes have half number of chromosomes	Gametes have half number of genes
3	Homologous pair of chromosomes separate during meiosis	Pair of gene are separated from each other during meiosis
4	Each pair assort independently	Independent assortment in genes pair

3427.	The work with respect to gene linkage and inheritance of eye colour in Drosophila was done by	Morgan's
3428.	The chromosomes theory of inheritance was confirmed in	1910
3429.	**DNA AS HEREDITY MATERIAL**	
3430.	**Griffith's Experiment (1928) :**	

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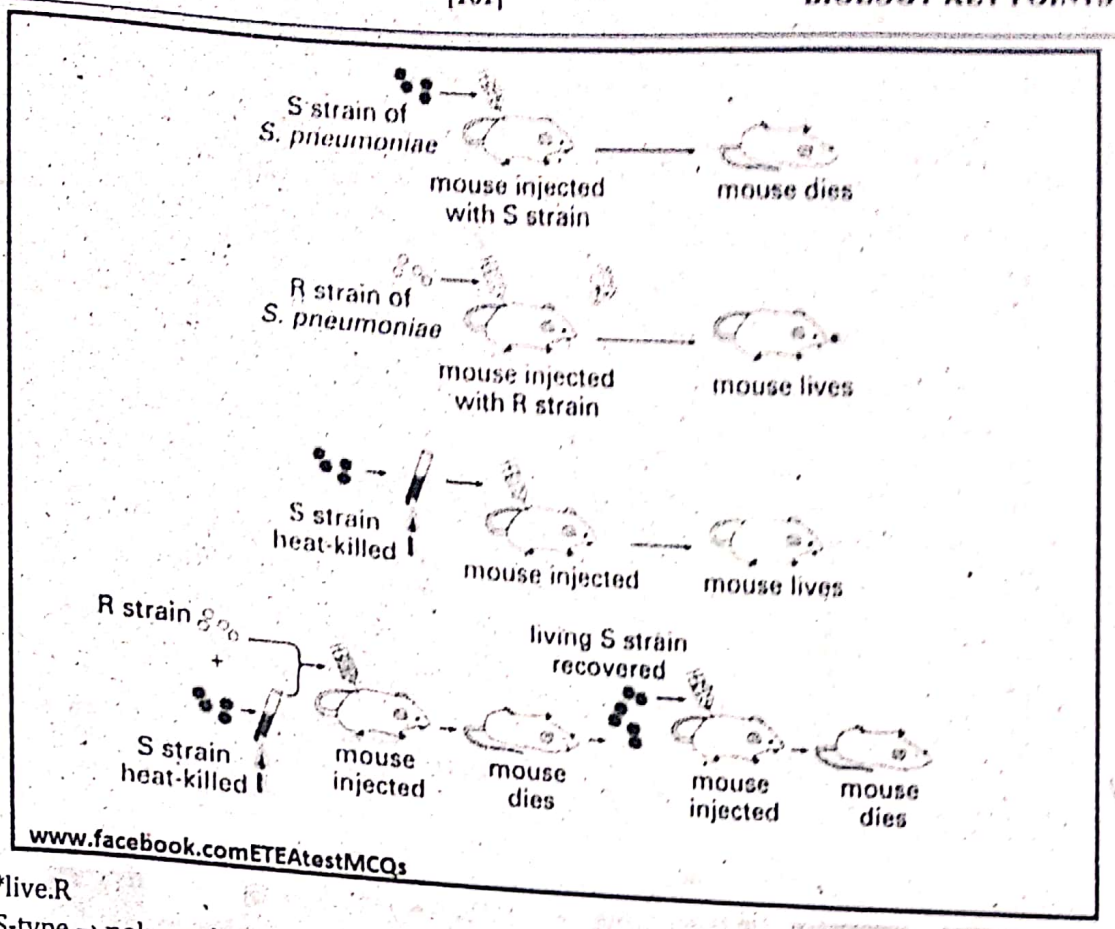

*live.R

S-type → polysaccharide membrane → smooth and shiny colony

R-type → no polysaccharide membrane → rough colony

3431.	The transfer of genetic material form one organism to another by which genetic make-up of recipient is called	Transformation
3432.	The agent responsible for transforming R-type to S-type went undiscovered until	1944

3433. **Avery's Experiment (1944):** ETEA-2014

In the classic series of experiments Oswald Avery along with Colin Macleod and Maclyn McCarty characterized what they referred as "transforming principle", they took dead S-type and live R-type mixture

Removed particle from S-type	Transfer	Result to mouse
Proteins	Occur	Die
Lipids	Occur	Die
Carbohydrates	Occur	Die
RNA	Occur	Die
DNA	Did not occur	Live

→ It is confirmed that transforming agent in Griffith's experiment is called DNA.

3434. **Hershey and Chase Experiment:**

→ to identify the viral part that is injected into the host at the start of infection.

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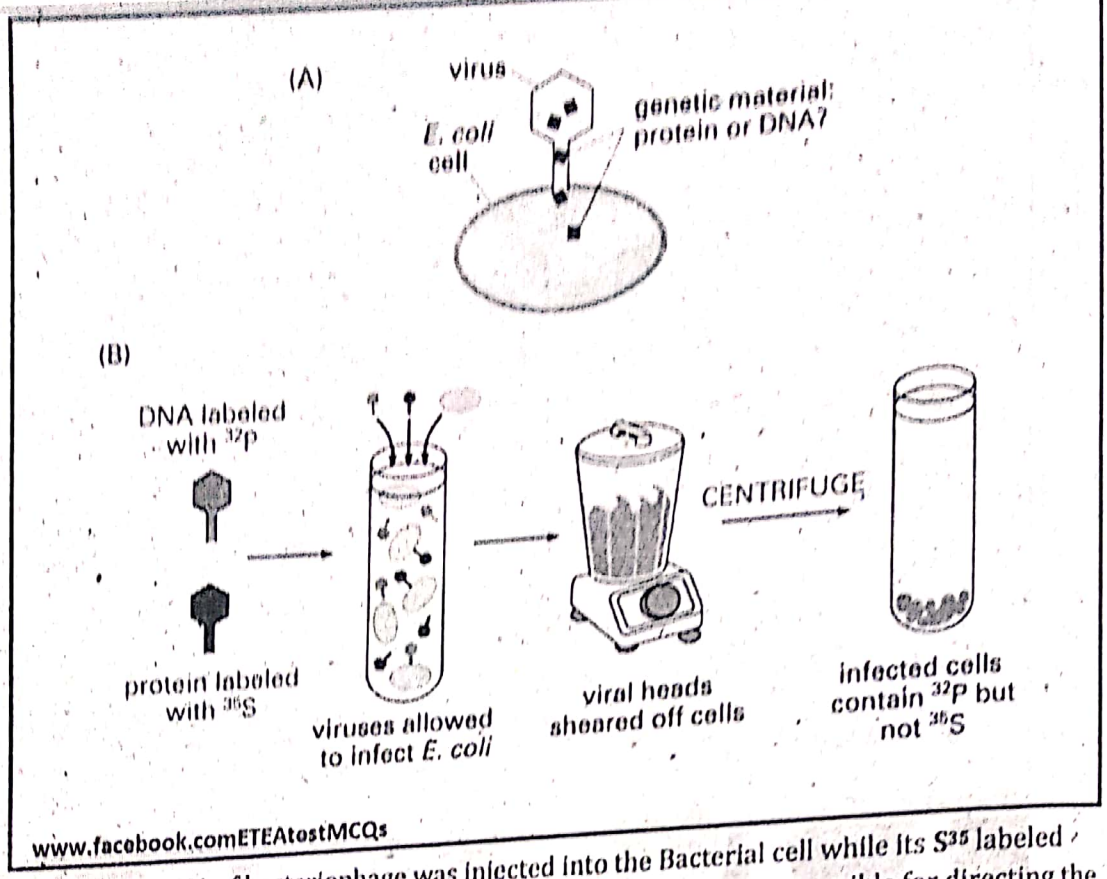

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→ P^{32} labeled DNA of bacteriophage was injected into the Bacterial cell while its S^{35} labeled protein remain constant. So virus DNA, not the virus protein, was responsible for directing the direction of new viruses. **ETEA-2017**

3435.

Exp riment	Year
Griffith's	1928
Avery's **ETEA-2014**	1944
Hershey and Chase	1952

3436.	It was not known that either DNA or protein possesses heredity information for bacteriophage till	1952
3437.	**DNA REPLICATION**	
3438.	The process of self-synthesis of DNA molecule is called	DNA replication
3439.	The process of DNA replication in the life cycle of cells occurs	Once is S-phase
3440.	The molecule of DNA which is replicated is called	Parent DNA
3441.	The molecule which is produced in DNA replication process is called	Daughter DNA
3442.	A parent DNA after replication give rise to	2 daughter DNA molecules

3443. **Three different models to explain the replication process:**
1. Semi conservative model
2. Conservative model
3. Dispersive model

3444.	The structure of DNA was proposed by Watson and crick and also proposed	Semi conservative model

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3445.	Parent DNA molecules becomes unwind and lost its base pairs and Both strands act as template produce two daughter DNA molecules	One old and one new (hybrid DNA)
3446.	Parental strands are partially conserved in both daughter DNA molecules	Semi-conservative model
3447.	Parental DNA remains in its duplex state, while a daughter DNA molecule is with both new strands is established.	Conservative model
3448.	Parental DNA become completely dispersed into fragments , which will mixed with new nucleotide fragments	Dispersive model

3449. Overall three models to explain the replication process in DNA:

S.No	Model	Parental DNA is
1	Semi conservative model	Partially conserved into daughter DNA
2	Conservative model	Fully conserved into daughter DNA
3	Dispersive model.	Dispersed into fragments

→ The three models of DNA replication were evaluated by Mathew Meselson and Franklin Stahl of the California Institute of technology on 1958.

3450. **Meselson-Stahl experiment:**

- **Culturing of bacteria**
  → Bacteria are grown in N^{15} heavy medium.
  → Transfer some bacteria to three separate plates contained ^{14}N light medium.
- **Sampling of DNA**
  1. Sample at 0 min
  2. Sample at 20 min
  3. Sample at 40 min
  4. Sample from pure ^{14}N medium
- **Centrifugation of DNA molecules**
  → All DNA samples are mixed with cesium chloride (CsCl) and then centrifugate it.
  →Cesium and chloride ions are pushed towards the bottom
- **Results of Centrifugation**

S.no	Sample	Position
1	Sample of N^{14} medium	Top
2	Sample at 0 min	Bottom
3	Sample at 20 min	Inte mediate or center
4	Sample at 40 min	Intermediate + top

- **Interpretation of results**

S.no	Sample and its position Position	Reason	No of DNA
1	Sample of ^{14}N medium→ Top	Lightest → both strands was ^{14}N.	1
2	Sample at o min → Bottom	Heaviest → both strands was ^{15}N.	1
3	Sample at 20 min→ Intermediate or center	Intermediate → one strand of ^{15}N and one of ^{14}N.	2
4	Sample at 40 min → Intermediate + top	Two sediments → ^{15}N strand form ^{14}N and other ^{14}N form also ^{14}N.	4

*The result was it that the replication of DNA is semi-conservative.

3451. **Phases of DNA replication:**

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	• Initiation phase • Extension / polymerization phase • Termination phase	
3452.	The initiation phase is characterized by the formation of replication bubble replication fork , which are formed at particular site called	Origin of replication site
3453.	**The number of origin of replication in** • Eukaryotic are more than one • Prokaryotic are only one	
3454.	Origin of replication is specific site of nucleotide in DNA from which	Replication starts
3455.	When DNA gyrase (tropoisomerases) and DNA helicase work together on DNA,	Replication bubble is formed
3456.	DNA duplex is converted from spider ladder like form to straight ladder like form by	DNA gyrase
3457.	The base pairs of DNA are break down by	DNA helicase
3458.	When the base pairs are broken down it give rise to bubble like Appearance to	origin of replication
3459.	When the base pairs are broken down, The single strand of DNA are prevented to pair up again by	Single Stranded binding(SSB) proteins
3460.	Each side of replication bubble is termed as	Replication fork
3461.	The formation of daughter strands(leading or lagging) along the temple strands are called	Extension or polymerization
3462.	The daughter strands are actually synthesized by	DNA polymerase enzyme
3463.	The enzyme DNA polymerase cannot work unless some nucleotide	Are arranged on template
3464.	To arrange some nucleotides on template strand the enzyme involved is	Primase enzyme
3465.	The short fragments of nucleotide are called	Primers
3466.	Primer is short oligonucleotide strand of RNA, act as start site for	DNA polymerase
3467.	**There are three types of DNA polymerases:** • DNA polymerases – I → role in termination phase of replication →provide support to the DNA polymerase III. • DNA polymerases – II → help in DNA repairing during cell life time • DNA polymerases – III **ETEA-2019** → proof reading → main enzyme that produce both daughter strands along template during replication process.	
3468.	The DNA polymerase-III is a huge dimer molecule and consist of	Two subunits
3469.	DNA polymerase-III cannot initiate replication process it only add	Nucleotide on 3'-OH group
3470.	To perform its activity DNA polymerase-III need a	Primer
3471.	The direction of replication of DNA is from	5' to 3' **ETEA-2017** **ETEA-2019**
3472.	The process of DNA polymerase-III to remove wrong nucleotide is called	Proofreading
3473.	Both units of DNA polymerase-III are linked together by a small	Polypeptide chain
3474.	The continuously daughter strand towards replication fork is	Leading strand

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3475.	The discontinuously growing daughter strand away from fork is	Lagging strand
3476.	The small fragment of lagging strand are called	Okazaki' fragments
3477.	The second unit of DNA polymerase-III are allowed to polymerize daughter strand up to a specific length such as • 100 – 200 nucleotides in prokaryotes • 1000 – 2000 nucleotide in eukaryotes	
3478.	The replacement of primer by DNA nucleotide is called	DNA polymerase-I
3479.	**DNA polymerase-I has dual function:** 1. Polymerase 2. Exonuclease	
3480.	The joining of Okazaki's fragment is carried out by	DNA ligase
3481.	To form continuous strand the bond formed b/w Okazaki's fragment	Is Phospodiester bond
3482.	The process in which mRNA copy the sequence of DNA with the help of RNA polymerase is called	Transcription **NMDCAT-2020**

DNA REPLICATION

3483. Replication begins with double stranded DNA being separated.
3484. Each original strand, called a parent strand, is used as a template for the complementary base pairing of nucleotide to make two new molecules.
3485. DNA replication occurs in the 5' to 3' direction adding new nucleotide to the 3' end of the newly forming strand.
3486. DNA replication will begin at a specific area of molecule called the origin of the replication.
3487. The origin of replication denotes the area of active replication called the replication fork
3488. A number of enzymes are needed for replication process;
3489. Helicase: separate the strands of the double helix
3490. Single stranded binding proteins: stabilize the newly single stranded regions
3491. DNA Gyrase: used to make sure the double stranded areas outside the replication fork do not supercoil.
3492. DNA polymerase: catalyze the addition of new nucleotide to the growing daughter strand.
3493. Other proteins: such as beta clamps and clamp leader, help hold the DNA polymerase in place on the DNA
3494. Short sequence of RNA, called primer, have to be paired to the template strands by the enzyme primase, because DNA polymerase cannot begin to add nucleotide without a primer.
3495. Replication of both stands occur at the same time, once using continuous synthesis and the other discontinuous.
3496. New nucleotide are added to the 3' end moving continuously towards the expanding replication fork.
3497. Discontinuous synthesis occur on the parent strand that is oriented 5' – 3', called the lagging strand and is completed in segment called Okazaki's fragments
3498. Replication on this primer uses primase to add primer ahead of the 5' end to the lagging strand.
3499. DNA polymerase-III then add short sequence of nucleotide, the Okazaki's fragments, to the primer filling in the gap.
3500. As the helix is opened further, this process repeats until the entire strand is replicated
3501. DNA polymerase-I replaces the RNA primer with DNA nucleotide
3502. DNA ligase is used to ensure bonding between the fragments and the replaced nucleotides.
3503. Once both the leading and lagging strands have completed their replications, two identical copies of DNA result.

3504. **GENE EXPRESSION**

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3505.	**Process of transcription is completed in three phases:** 1. Initiation phase 2. Elongation phase 3. Termination phase	
3506.	Transcription begins with the binding of RNA polymerase at	Promoter region
3507.	Promoter is regulatory region of gene which provides binding site	For RNA polymerase
3508.	**Binding sites in prokaryotes:** 1. TATAAT → -10 sequence 2. TTGACA → -35 sequence **Binding sites in eukaryotes:** 1. TATA (TATA box) → -25sequence **ETEA-2017** 2. CAAT (CAAT box) → -70 sequence	
3509.	Subunits of RNA polymerase are	Four
3510.	The three subunits are also called	Core enzyme
3511.	The factor which is required for RNA polymerase to bind to the promoter are	Sigma factor
3512.	In prokaryotes, the number type of RNA polymerase is only	One type
3513.	In eukaryotes, the type of RNA polymerase are three: **ETEA-2014**	

S.No	Type	Synthesize
1	RNA polymerase – I	rRNA
2	RNA polymerase – II	mRNA
3	RNA polymerase – III	tRNA

3514.	The template strand is also called	Antisense
3515.	The other strand is also called	Coding or sense strand
3516.	In elongation phase, towards the terminal region the RNA polymerase keep on moving towards the	5' to 3' direction
3517.	The terminator region consist of GC pairs followed by series of	AT base pairs
3518.	The loop like structure formed by mRNA in termination phase is called	GC hairpin followed by AU nucleotide
3519.	The GC hairpin causes the RNA polymerase to stop the synthesize of	RNA
3520.	A process by which primary mRNA is converted into mature RNA or functional RNA is called	Post transcriptional modification **ETEA-2015**
3521.	The post transcriptional modification process is only associated with	Eukaryotic transcription
3522.	The post transcription modification process is not occur in prokaryotes due to Absence of a	True or definite nucleus
3523.	The enzymes which can degrade mRNA before its translation are	Phosphatases and nucleases
3524.	Exon → proton coding sequences Introns → non – protein coding sequences	
3525.	To remain stable the cap and tail are added to the both ends of	Primary mRNA
3526.	A cap(attached to 5' end) is in the form of	7-methyl GTP
3527.	A tail or poly-A tail(attached to 3' end) is small chain of	30-500 adenine nucleotides
3528.	The removal of introns and maturation of primary mRNA to secondary	RNA splicing

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	or functional mRNA is called	
3529.	The sequence of genetic nucleotides in DNA or RNA that determines the specific amino acids sequences of the proteins is called	Genetic code
3530.	The total number of codes of codons are	64
3531.	**Start codon** → AUG **Stop codons** →UGA, UAG and UAA **ETEA-2017**	
3532.	The three stop codons are also called	Non sense codon **ETEA-2017**
3533.	All amino acids that encode specific amino acids except stop codons are also called	Sense codon
3534.	Amino acids leucine and serine are encoded by	Six codons **ETEA-2018**
3535.	An amino acids can be encoded by	More than one codon
3536.	GAA and GAG both specify an atomic acid called	Glutamic acid
3537.	The genetic code is universal, it is common in	All the organism
3538.	AGA specifies arginine in bacteria, in human and	All organism
3539.	The study of genetic codon of mitochondrial DNA however , showed that genetic code is not that universal. e.g:	

Codon	Nuclear DNA	Mitochondrial DNA ETEA-2015-2017
UGA	Stop codon	Tryptophan
AUA	Iso leucine	Methionine
AGA & AGG	Arginine	Stop codon

3540.	In bacteria, translations occur in the	Cell's cytoplasm
3541.	In eukaryotic, the translation occur in the membrane of the	Endoplasmic reticulum
3542.	The region of smaller ribosomal subunit where first aminocyl tRNA complex is attached is called	P site (peptidyl side) **ETEA-2017**
3543.	**REGULATION OF GENE EXPRESSION**	
3544.	When expression of gene is quantitatively is increased by the presence of specific regulatory protein (the activator) is called	Positive gene regulation
3545.	When the expression of gene is diminished by the presence of specific regulatory protein (the repressor) is called	Negative gene regulation
3546.	Catabolism of a substrate obtained from outside called	Lac operan
3547.	Biosynthesis of a given amino acid is called	Try operan
3548.	Lac operan consist of: 1. One regulatory region → i gene → codes for the represse of the lac operan. 2. Three structural regions:	

Regions	Codes for	
z	β-galactosidase	Responsible for hydrolysis of disaccharides
y	Permeases	Increase permeability of the cell to β-galactosidase
a	Transacetylase	An enzyme that transfer an acetyl group from acetyl-CoA to β-galactosidase

3549.	**MUTATION**	
3550.	A gene mutation is permanent change in	DNA sequences

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3551.	**A mutation may occur in:** 1. Single DNA nucleotide 2. Segment of chromosomes or whole chromosomes 3. Change in number of chromosomes	
3552.	**Causes of mutations:** • Radiation • Viruses • Transposons • Mutagenic chemicals as well as errors	
3553.	The agent that cause mutation is called	Mutagens
3554.	The organism in mutation occur is called	Mutant
3555.	Mutation that occur in more than one percent of the population are called	Polymorphisms
3556.	Mutation that transfer from parent to child are called	Heredity mutation or germ line mutations
3557.	Mutation that occur only in egg or sperm cell, or those that occur just after fertilization are called	New (de novo) mutations
3558.	Onto next generation, Acquired mutation in somatic cell	Cannot be transfer
3559.	Mutations that occur due to internal factor are called	Spontaneous mutations
3560.	Mutations that are produces by external factors are called	Induced mutations
3561.	A mutation that cause change of single or few nucleotide are called Point mutation	

Deletion	Removal of one or few nucleotide from particular segment of DNA.
Insertion	Addition of one or few nucleotide in particular segment of DNA
Base substitution	Replacement of one or few nucleotide in a particular segment of DNA

3562. Mutation that cause change in the structure or number of chromosomes are called Chromosomal mutation or aberration.
Structural changes are of following types:

Deletion	Removal of segment of chromosomes comprising single of few genes
Inversion	Chromosomes breaks off, turns around and join so that sequence become inversed
Translocation	Shifting of a segment of one chromosomes to another non homologous chromosomes
Duplication	Repetition of one or few genes in the same chromosomes

3563.	Change in number of chromosomes due to addition or loss of one or more chromosomes are called	Aneuploidy

3564. Aneuploidy are of following types:

S.No	Types	As a result of
1	Monosomy (2n-1)	Loss of single chromosomes from diploid set .
2	Nullisomy (2n-2)	Loss of pair of homologous chromosomes from diploid set .
3	Trisomy (2n+1)	Addition of single chromosomes in diploid set (down syndrome and Klinfelter's syndrome).
4	Tertrasomy(2n+2)	Addition of pair of homologous chromosomes in diploid set.

3565.	Change in number of chromosomes due to addition or loss of one or more complete set of chromosomes are called	Euploidy

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3566.	Euploidy is the state of cell or organism having an integral multiple of the monoploid (single set) number of chromosomes. It is also called	Polyploidy

3567. Various forms of euploidy are:
- Triploidy → three sets
- Tertaploidy → four sets
- Pentaploidy → five sets
- Hexaoploidy →six sets and so on.

3568. Major types of mutagens:

Physical mutagens	Chemical mutagens		
X-rays	Nitrous acid	Acridines	Pesticides
Gamma rays	Formaldehyde	Colchicine	Food preservatives
U.V rays	Mustard gas	Caffeine	
Cosmic rays (background radiation)	5-bromouracil	Nicotine	

→H.J Muller was the first to induce mutation by physical method using X-rays in Drosphila.
→The first chemical mutagens was mustard gas that was used as a chemical weapon during 1st world war.

3569. **DISEASE INDUCED BY MUTATION**

3570. **Disease induced by mutation:**
1. Sickle cell anemia
2. Phenyl ketonuria (PKU)
3. Down syndrome
4. Turner' syndrome
5. Klinefelter,s syndrome

3571.	The low number of red blood cells are called	Anemia
3572.	The rapid breakdown of red blood cell cause yellowing of eyes and skin which are symptoms of	Jaundice
3573.	Almost all patients with sickle cell anemia have painful episodes	Called crises
3574.	Sickle cell anemia is caused by recessive allele HbS which encodes defective allele for β globin as a result of abnormal haemoglobin called	Haemoglobin S
3575.	HbS is originated from HBA(normal haemoglobin) due to	Point mutation
3576.	Sickle cell anemia is much common in people of african and	Mediterranean descent
3577.	Folic acid is needed to make	Red blood cells

3578. **The crises can affect the bones of:**
1.The back 2. The long bone 3. The chest

3579. **Treatment of sickle cell anemia crises:**
1. Blood transfusions.
2. Pain medicines
3. Plenty of fluids

Since 2016

3580.	In Phenyl ketonuria (PKU), the baby is born without the ability of proper break down of the an amino acid called	Phenylalanine
3581.	Both parents must pass the defective gene to have Phenyl ketonuria (PKU). This condition is called	Autosomal recessive trait
3582.	Babies with PKU are missing an enzyme called	Phenylalanine hydroxylase
3583.	Phenyalanine have major role in production of the	Melanin

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3584.	Melanin is responsible for the production of the	Hair and skin colour
3585.	A special infant formula that is for infant with PKU are	Lofenalac
3586.	Smaller skin folds at the inner corner are called	Epicanthic field
3587.	White spots on coloured part of the eye are called	Brushfield spots
3588.	The genetic origin of down syndrome was discovered by the	Jerome Legeunu

3589. **Down syndrome:** ETEA-2016

Age	Birth
Before 30	1 per 800
35	1 per 350
40	1 per 100

Klinefelter's syndrome:

1. 1 in 5000 to 1000
2. 1 in 50,000

Turner's syndrome:

1. 1 in 2500

3590.	Klinefelter's syndrome was named after Dr klinefelter who	Symptoms on men
3591.	In 1938, Henery Turner first describe	Turner syndrome
3592.	When mother produce an egg lacking X chromosomes are called	Nullo gametes

ETEA-2014-16-17

	Down syndrome	Turner syndrome	Klinefelter's syndrome	
	2n+1	2n-1	2n+1	
Also called	Trisomy 21		XXY syndrome	
		Missing 1 X chromosomes	Male have extra X chromosomes	
		Only in females	Only in males	
			Does not occur in females	
Sign and symptoms	Flattened face and nose Short neck Small mouth Protruding tongue Small ears Epicanthic fold Brushfield spots Short hand Short fingers Poor muscle tone Not average height	95% adult are short stature Non-functional ovaries Infertile Pregnancy with donor embryo are possible Middle ear infections hearing loss Good verbal skill Good reading skill Problem with mathematics	As baby	Weak muscles
			Pubert y	Not much testosterone
			Teens	Larger breast Weaker bone Trouble in 'fitting in"
			Adults	No/little sperm 95-99% are infertile
			Else	Language trouble
Cause and risk factors	Autosomal no-disjunction Half IQ to normal	Non disjunction Nullo gamate	Non disjunction during oogenesis in mother	
Treatment	No specific treatment Corrective surgery Regular health checkups Fully included in family	Growth hormone injection Estrogen and progesterone replacement therapy	Testosterone replacement therapy (TRT)	

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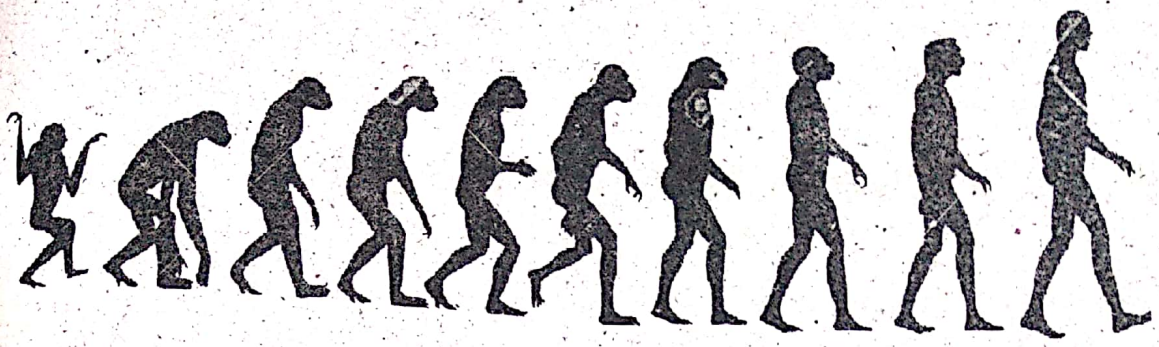
CHAP# 24 Evolution



S.No	Questions	Answers
3593.	**THE EVOLUTION OF THE CONCEPT OF THE EVOLUTION**	
3594.	**The evolution of the concept of evolution:**	

Scientist	Theory
Aristotle	The scala naturae
George Cuveir	Theory of catastrophism
James hutton and Charles lyell	Uniformilatarianism ETEA-2014
Lamark	Organism evolved through inheritance of acquired characteristic
Charles Darwin	Natural selection

3595.	**EVOLUTION OF EUKARYOTIC FROM PROKARYOTIC**	
3596.	**The process involved in the evolution of eukaryotic are:** 1. Endosymbiosis 2. Membrane infolding	
3597.	Fossils records indicate that eukaryote evolved from prokaryote somewhere between	1.5 to 2 billion years age
3598.	The eukaryotic organelles which are formed from prokaryote are	Mitochondria & chloroplast
3599.	Both the mitochondria and chloroplast have their own genes, circular DNA and RNA, and reproduce by binary fission independent to the host's cell cycle, this is evidence for	Endosymbiosis
3600.	Inner membrane of both mitochondria and chloroplast are more similar to	Prokaryotes rather than eukaryotes
3601.	The outer membrane of mitochondria and chloroplast resembles to	Eukaryotes
3602.	It can be said that first eukaryotic was formed from prokaryotic, symbiotic and	Multicellular interaction
3603.	**LAMARKISM**	
3604.	Lamark was first soldier then botanist and finally	Professor of zoology
3605.	Lamark gives an explanation of evolution based on the	Inheritance of acquired character
3606.	Structural change in the body of an organism involving a deviation from normal, induced in the life time of an individual due to certain changes in the environment i.e use or disuse of an organ	An acquired characters

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3607.	**The examples given by Lamark to prove his theory:** • The legs and neck of giraffe become long and this habit passes from generation to generation in order to reach high leaves of trees. • Due to crawling of snakes the feet of snakes reduces.	
3608.	Lamarckism is the inheritance of acquired character, which is wrong in terms of	Principle of genetics
3609.	**DARWANISM**	
3610.	The types of Finches found at Galapogos islands are	13 types **ETEA-2018**
3611.	**Silent features of Darwin-Wallace theory are:** • Over production • Struggle for existence • Variation • Natural selection of survival of the fittest • Speciation or origin of new species	
3612.	**Struggle for existence may be three fold in nature:** 1. Intra specific struggle or rivals → competition between member of the same species 2. Inter specific struggle or pray or predation → competition between members of the different species 3. Extra specific struggle or environmental struggle → struggle against force of nature	
3613.	**Variation are of two types :** 1. Harmful variation → results an extermination 2. Useful variation →increases chances of survival	
3614.	The term "natural selection" was used by the	Darwin
3615.	The term "survival of the fittest" was used by the	Herbert selection
3616.	**NEO-DARWANISM**	
3617.	**The modern accepts five major causes of evolution:** 1. Gene and chromosomal mutation 2. Genetic recombination 3. Natural selection 4. Genetic drift 5. Reproductive isolation	
3618.	The genetic drift determines	Evolution
3619.	Structural that have same arrangement of parts and similar mode of development but different functions are called	Homologous structures
3620.	**Evidence of evolution from comparative anatomy:** The following bones consists of same number of bones, muscles, nerves and blood vessels arrangement in the same pattern with similar mode of development: **ETEA-2014** • Human hand • Bat's wing • Cat's paw • Horse front leg • Front flipper of whale	
3621.	Structures that have the same function and are specially alike, such as wings of birds, wings of butterfly and that of a flying lizard, such structures are called	Analogous

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3622.	*Archaeopteryx*, the fossil bird, discovered from rocks in	East Germany
3623.	The bird which possessed both reptilian as well as avian characters	*Archaeopteryx*
3624.	Modern horse is called	Equs
3625.	A progression of fossils can be tracked back over 60 million years ago to the "drawn hose called"	*Eohippus*
3626.	The birds are	Glorified reptiles

3627. **Evidence of evolution from vestigial organs:**

1. Vestigial organs in human beings: **ETEA-2012-16**
   - Nictatings membranes of eye
   - Appendix
   - Coccyx or tail bones
   - Mammary glands of male
2. Vestigial organs in Whales:
   - Hind limbs buried in flesh
3. Vestigial organs in Python:
   - Hind limb

3628. **Evidence of evolution from biochemistry:**

The aspect of common origin are:

- DNA and RNA
- Protein synthesis process
- Occurrence of ATP

3629. **Evidence of evolution from Molecular biology:**

- DNA and RNA are mechanism of inheritance
- Gene activity
- Similar structures of genes
- Same mechanism of trapping and transforming energy

3630. **Evidence of evolution from embryology:**

- The embryo of adult vertebrates resemble one another
- Recapitulation theory of Von bear or biogenetic law of Hackle state that in development each individual tends to climb to its own family tree.
- Zygote can be supposed to be the unicellular ancestor and the gastrula a diploblastic ancestor in many organisms.

3631.	The process of two or more related species becoming more and more dissimilar is called	Divergent evolution
3632.	Similarity due to share developmental pathways	Homology

3633. The kit fox and the red fox provide an example of two species that have undergone divergent evolution. **ETEA-2018**

	Kit fox	Red fox
Live in	Deserts	Farmland and forests
Colour	Sandy colour	Red colour
Ears	Large(help to excess body heat)	Small

3634.	The process whereby organisms not closely related(not monophyletic), independently evolve similar trait as a result having to adopt to similar environments or ecological niches	Convergent evolution
3635.	Some animals have organs which perform same function and yet they are different in their origin and structure, they are called	Analogous organs **NMDCAT-2020**

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3636.	The cactus, which grows in the American desert resembles to the Euphorbia, which grows in the African desert resembles in their	Fleshly stem armed with spines
3637.	Similar nature of the flight/wings of insects, birds, pterosaurs and bats are example of	Convergent evolution
3638.	**Hardy-weinberg:** The Hardy-weinberg principle states that in a large randomly breeding population, allelic frequencies will remain in the same generation to generation in the absence of the following conditions: • Mutation • Natural selection • Infinite large population • All mating is totally random • All members of the population breed • There is no migration in or out of the population • Everyone produces the same number of offspring	
3639.	**Hardy-Winberg equilibrium equation** → $p^2 + 2pq + q^2 = 1$ p is frequency of dominant allele q is frequency of recessive allele Here p^2 is frequency of dominant allele(AA), 2pq is the frequency of the heterozygous(Aa) q^2 is the frequency of homozygous (aa) ones.	
3640.	When the population size is limited and by chance some alleles increase or decrease in frequency, this is called	Genetic drift
3641.	Unlike natural selection, mutation is randomly and Rarely produce to	environment
3642.	Evolution in its modern form was first explored by Charles Darwin in	1859
3643.	Descent in modification means	Evolution
3644.	The evolutionary process by which new biological species arises	Speciation
3645.	The time from which life is originated is some	3.5 billion years ago
3646.	**Types of speciation:** ETEA-2015 1. Sympatric speciation → rare 2. Allopatric speciation → most common form 3. Parapatric speciation → extremely rare	
3647.	The speciation phenomenon which occurs through polyploidy, in which an offspring or group of offspring will be produced with twice the	Number of normal chromosomes
3648.	A tetraploidy plants can fertilize	Itself and create offspring
3649.	A tetraploidy animal to reproduce, it Must find another	Animal of same species
3650.	The speciation which occur which population of species becomes	Geographically isolated
3651.	When the population are separated not by geographical barrier but an extremely change in habitat is called	Parapatric speciation

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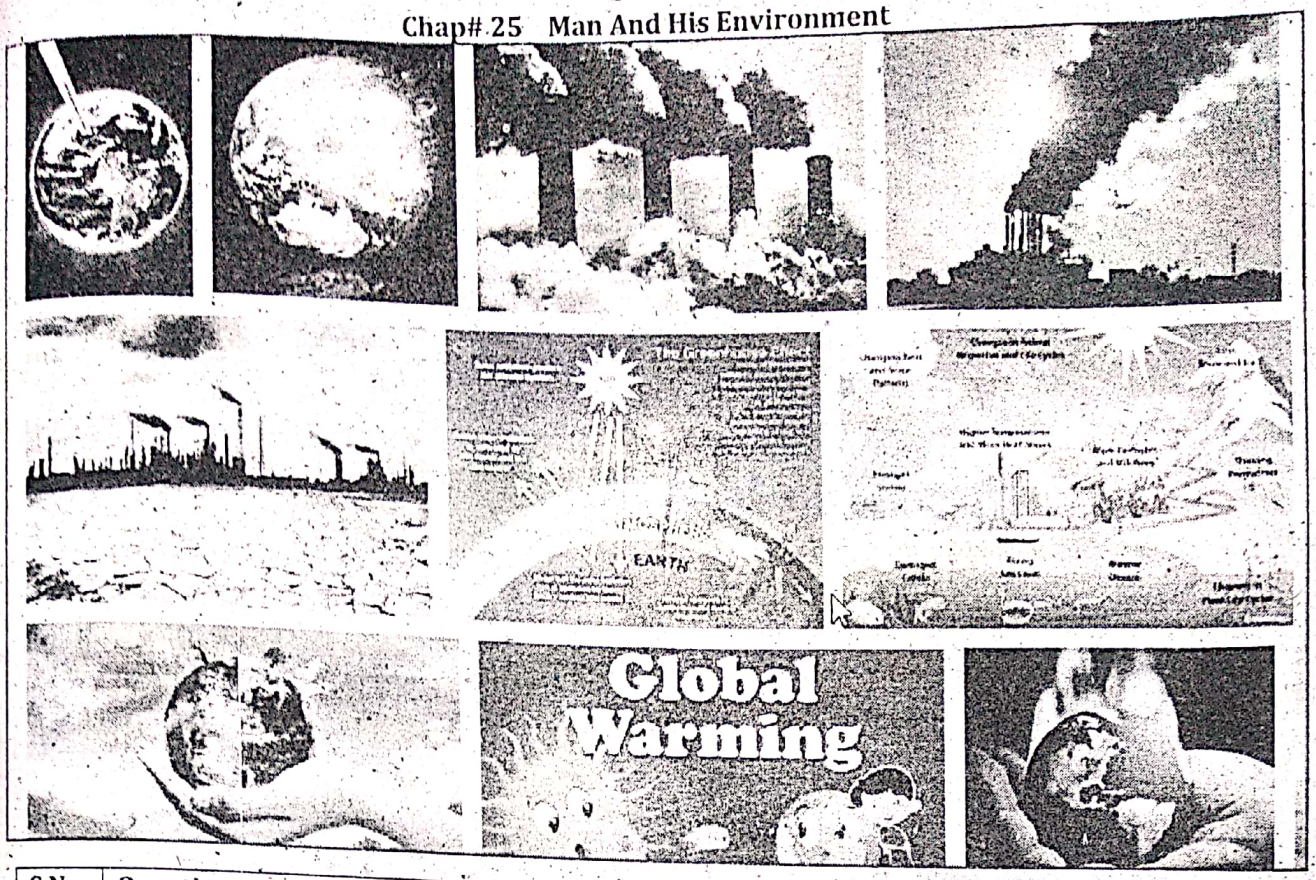
Chap# 25 Man And His Environment



S.No	Questions	Answers
3652.	**BIOGEOCHEMICAL CYCLES**	
3653.	The surrounding in which organism live is called	Environment
3654.	The thing which man required for his survival and comfort are called	Sources
3655.	Maintaining the natural resources of the environment and their careful use is called	Conservation
3656.	The flow of chemical elements and compounds between the living organism and the physical environment is called	Biogeochemical cycle
3657.	**The six elements out of 92 which are critical for the life of living organism are:** 1. Hydrogen 2. Carbon 3. Nitrogen 4. Oxygen 5. Phosphorus 6. Sulfur → These six constitute 95% mass of all living organisms.	
3658.	The substance that cover three-fourths of the earth surface is	Water
3659.	The salt water present on earth is	97%
3660.	The percentage of fresh water is	3% **ETEA-2019**
3661.	The fresh water present in the form of ice is	66% of total
3662.	The water present in solid form is	2%
3663.	All the world water which is useful for humans and land animals are	1%
3664.	The water present in the form of vapors is	Fresh water
3665.	**Once the water reaches the ground, one of the two process may occur:** 1. Some water evaporate back to atmosphere	

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	2. The water may penetrate and may become surface water	
3666.	The balance of water that remain on the earth surface is	Runoff
3667.	The earth atmosphere almost	80% nitrogen gas
3668.	The green plant convert atmospheric nitrogen into	Proteins
3669.	Microorganisms break down the proteins and releases	Ammonium ions
3670.	The nitrogen cycle is movement of nitrogen between the earth and	Atmosphere
3671.	**The nitrogen cycle can be broken down into four types of reactions:** 1. Nitrogen fixation 2. Biological fixation 3. Nitrification 4. Denitrification	
3672.	**Nitrogen fixation:** Nitrogen gas can be fixed by three ways: 1. Atmospheric fixation → 5-8% 2. Industrial fixation →32-35% 3. Biological fixation → 60%	
3673.	The process which is used for making nitrogen containing fertilizers	Haber process
3674.	The reduction of nitrogen gas to ammonia requires ($N_2 + 3H_2 \rightarrow 2NH_3$)	16 molecules of ATP
3675.	**Types of nitrogen fixing bacteria:** **ETEA-2013** 1. Free living • *Azotobacter* → aerobic • *Clostridium* → anaerobic 2. Symbiotic association • *Rhizobium*	
3676.	Rhizobium form symbiotic association with roots of leguminous plants and appear in the form of swelling called	Nodules
3677.	Free living rhizome invade the legume through an	Infection thread
3678.	Infection thread is formed in the	Root hair of plant
3679.	Each root nodule is packed with thousands of living	Rhizobium bacteria
3680.	The infection thread is constructed by root cells and not he bacteria and is formed only in response of	Infection
3681.	Root nodulated non-legume is a diverse group of woody species such as elder with e.g Frankia. These filamentous bacteria infects the roots of plants forming	Actinorhizal root nodules
3682.	*Anabaena azollae* is a cyanobacteria that infect new leaves of	*Azolla*
3683.	Nitrogen fixing bacteria contain an enzyme called	Nitrogenase
3684.	An enzyme that catalyses of nitrogen gas to ammonia	Nitrogenase
3685.	Nitrogenase supplies energy from ATP and also provide	Hydrogen
3686.	The nitrogenase complex become inactivated when exposed to	Oxygen **ETEA-2018**
3687.	Nitrogenase complex become inactivated when exposes to oxygen while this problem is not present free living bacteria such as	Clostridium
3688.	Free living bacteria have a variety of different mechanisms for protecting the nitrogenous complexes such as	High rate of metabolism and physical barriers
3689.	Bacteria having highest rate of respiration of any organism, thus maintaining a low level of oxygen in their cells	Azotobacter
3690.	Rhizobium contains leghaemoglobin, it work similar to	Haemoglobin
3691.	Frankia and Anabaena are able to exclude oxygen by carrying out the	Vasicles and a

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	fixation in specialized structures respectively as a	heterocyst
3692.	The thick walls of vasicles and heterocyst form an	Oxygen carrying barrier
3693.	The oxidation of ammonium compounds to nitrites and then to nitrites by the nitrifying bacteria. This process is called	Nitrification
3694.	**Nitrification is a two-steps process:** ETEA-2014 • Ammonium → nitrites(NO_2^-) (by Nitrosomonas bacteria) • Nitrites → nitrates(NO_3^-) (by Nitobacter) ETEA-2012 → Nitrite is toxic to plant and present in animals while nitrates can be taken by plants.	
3695.	The conversion of nitrates into primarily nitrogen gas and nitrous oxide gas by denitrifying bacteria e.g. Pseudomonas. This process is	Denitrification
3696.	The conversion of organic form of nitrogen into organic nitrogen	Ammonification
3697.	**ENERGY FLOW THROUGH AN ECOSYSTEM**	
3698.	Ammonification process is carried out by	Decomposers
3699.	The net energy production at one trophic level is passed on to next level is	10%
3700.	The total amount of organic matter that is produces through photosynthesis is called	An ecosystem's gross productivity (GPP)
3701.	The amount of energy that remains available from plant growth after subtracting the friction that plants uses for respiration is called	Net primary production (NPP)
3702.	Productivity in land ecosystems generally rises with temperature up to about	30° C
3703.	Due to warm, the land primary productivity is	Highest
3704.	In contrast, desert scrub ecosystems have the lowest productivity because their climates are	Extremely hot and dry
3705.	In oceans light penetrate only into the uppermost level of oceans, so photosynthesis occurs in	Surface and near surface water
3706.	Among aquatic systems, the highest net primary production is that of	Algal buds and coral reefs
3707.	In contrast to land, the most primary production is carried out by	Vascular plants
3708.	Most primary production in the oceans is done by	Microscopic algae
3709.	A graphical representation designed to show the number of organisms, energy relationships and biomass of an ecosystem	Eltonian pyramids or Ecological pyramid
3710.	**There are three types of pyramids:** 1. Pyramid of energy → g/m^2 or C/m^2 2. Pyramid of biomass 3. Pyramid of numbers	

Levels of organisms	Pyramid of energy	Pyramid of biomass	Pyramid of numbers
Third level consumers	0.1%	1.5	
Secondary consumers	1%	11	90,000
Primary consumers	10%	37	200,000
Primary producers	100%	309	1,500,000

3711.	**ECOLOGICAL SUCCESSION**	
3712.	A directional, non-seasonal cumulative change in the type of plant species	Succession

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	that occupy a given area through time is called	
3713.	When species composition changes no longer occur with time and this community is said to be	Climax community
3714.	**On the basis of origin, ecological succession may be of following types:** • Primary succession • secondary succession • Xerach succession • Hydrash	
3715.	The lichen colonies on these boulders on the first step in	Xerach succession **ETEA-2014-18**
3716.	The term xerose refers to changes in community structure during	Xerach succession
3717.	**A xerosere may include:** • Lithoseres on rocks • Psammoseres on sand	
3718.	**Stages of lithoseres:** 1. Crustose lichen stage 2. Foliose and fructiose lichen stage 3. Moss stage 4. Herb stage 5. Shrub stage 6. Tree stage 7. Forest or climax stage	
3719.	**POPULATION DYNAMICS**	
3720.	**Properties of population include:** • Population size • Population density • Patterns of dispersion • Demographics • Population growth limits on population growth	
3721.	**Three common patterns of population:** 1. Clumped distribution (attraction) 2. Uniform distribution (repulsion) 3. Random distribution (minimal interaction/influence)	
3722.	The maximum stable population size that a particular environment can support over a relatively long period of time	Carrying capacity
3723.	Random spacing occurs in the absence of strong attraction or repulsion among	Individuals of population
3724.	The malnourished in all over the world are about	1 to 2 billion
3725.	The people that are now hungry and malnourished in china are	80 million
3726.	Most of the 99% food supply of the world comes from the	Land
3727.	The 1% food supply to world comes from	Ocean and aquatic habits
3728.	To form 25 mm of soil under agricultural conditions need	500 years
3729.	During one growing season, a hectare of corn will transpire	5 million liters water
3730.	The amount of water needed to reach to 1 hectare is	8 million liters
3731.	The fresh water which is used by agricultural is	87 %
3732.	The disease occur due to lack of clean water in developing countries are	90 %

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	about	
3733.	The cases of diseases that are contracted from water are	4 billion
3734.	The death occurs due to water-borne disease are about	6 million per year
3735.	The number of people living in urban areas is doubling every	10 to 20 years
3736.	Human and environment are	Inseparable
3737.	Nuclear energy is the energy stored in the	Nucleus of atom
3738.	The nuclear accident at Chernobyl was the worst nuclear accident to date, spewing about	100 million curies radioactive materials
3739.	**HUMAN IMPACTS ON ENVIRONMENT**	
3740.	**Sources of carbon dioxide:** • Fossil fuel combustion • Electricity generation (41 %) • Industry • Residential and commercial • Transportation (2nd largest source) • Deforestation • Geological sequestration	
3741.	Permanent removal of standing forest is called	Deforestation
3742.	The rise in average global temperature at the end of next century is	1.5° C to 4.5° C
3743.	Acid rain have PH	Less than 5.6
3744.	**Serious environmental sequences causes by acid rain:** • Increase in the soil acidity • Effects the fertility of soil • Destroys vegetation • Kills the aquatic life • Cause stone cancer, which has corrosive effect on marble structure	
3745.	The ozone layer or stratospheric ozone is a high concentration of ozone molecule on the height from	30-50 kilometers the maximum
3746.	Ozone molecules are about 12,000 in	1 Arab of total molecules
3747.	The oxygen molecule is broken down to oxygen atom, which on combination with oxygen molecule form ozone. This breakdown is	Done by Ultra violet rays of sun
3748.	The measurement unit defining ozone layer "thickness" is the	Dobson (DU)
3749.	100 Dobson unit indicate that the ozone layer is	1mm thick
3750.	3 lac non-melanoma and 4500 melanoma skin cancers worldwide annually caused due to	10 % decrease in ozone
3751.	16 million people in the world every year suffer from blindness due to	Loss of transparency of lens
3752.	20% of cataracts may be caused by over exposure to the	UV radiation
3753.	**ENVIRONMENTAL RESOURCES & THEIR DEPLETION**	
3754.	**Natural resources:** ETEA-2010-2011	

Renewable sources	Non-renewable sources
Animals	Fossil fuels
Insects	Oil
Reptiles	Coal
Water	Copper

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Gross	Diamonds
Solar	Natural gas
Wind energy	Iron ore
	Minerals
	Gold

3755.	The main cause of source depletion is	Man
3756.	**Causes of source depletion:** • Over-consumption • Non-equitable distribution of resources • Over population • Burn agricultural practices • Technological and industrial practices • Erosion • Irrigation • Mining of oil and minerals • Aquifier depilation • Forestry • Pollution or contamination of resources	
3757.	Tidal power is also called	Lunar energy
3758.	When the gravitational forces due to the sun and the moon add together, tides of maximum range, called	Spring tides
3759.	When the two forces opposes each other, tides of minimum range is called	Neap tides
3760.	Approximately tidal cycles in one year are about	705
3761.	The outer crust of earth has an average thickness of 32km and below that is	Magma
3762.	The average increase in temperature with depth of earth is 1°C for every	30 to 40 meter depth
3763.	At depth of 3-4 km in earth	Water boils
3764.	At depth of 15kms the temperature is in range of	1000°C to 12000°C
3765.	**Non-conventional energy sources:** • Tidal power • Wind power • Geothermal power • Wave power • Magneto Hydro Dynamic(Mhd) generation • Solar energy	

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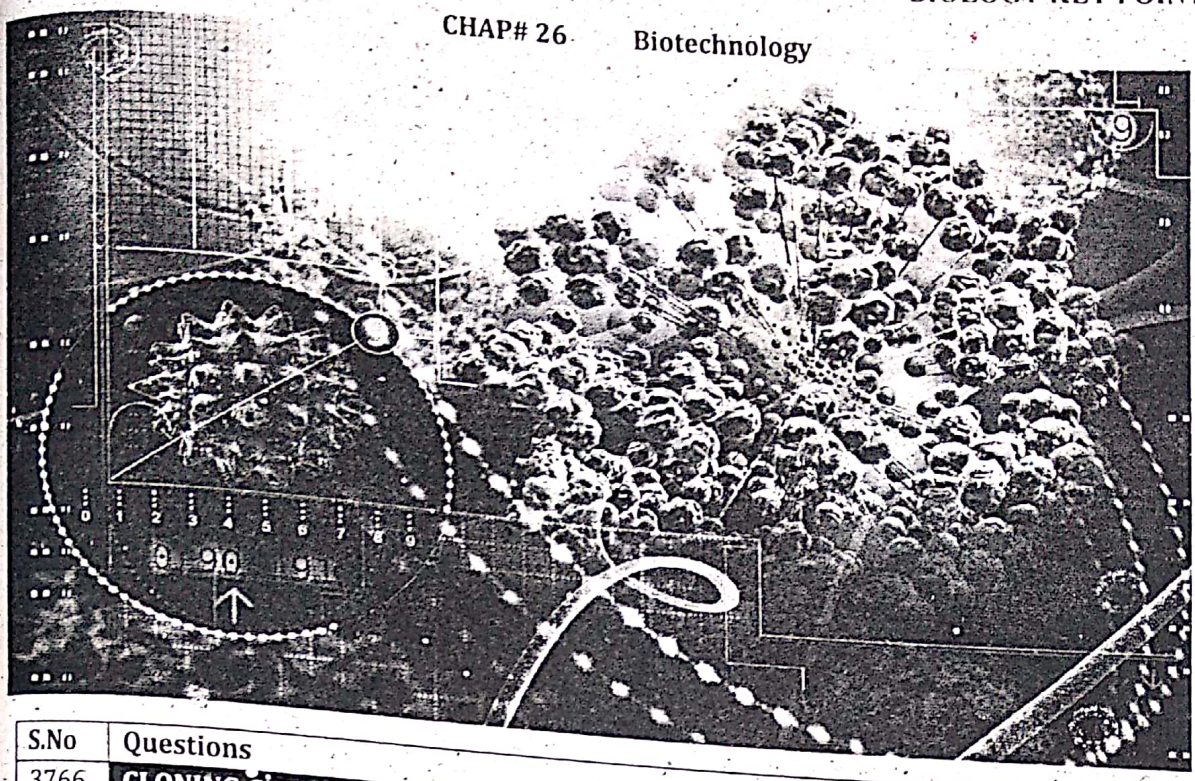
CHAP# 26 Biotechnology



S.No	Questions	Answers
3766.	**CLONING GENES**	
3767.	The history of biology is as old as history of	Man
3768.	The use of living organism or their processes and products for the welfare of mankind is called	Biotechnology
3769.	The act of making copies, or clones, of a single gene is called	Gene cloning
3770.	**The two possible ways of cloning of genes are** • Recombinant DNA technology • Polymerase chain reaction (PCR)	
3771.	**Components or tools required for Recombinant DNA technology are:** NMDCAT-2020 • Gene of interest • Molecular scissors • Molecular carrier or vectors • Molecular glue • Expression system	
3772.	**The desired gene or gene of interest can be obtained by following three possible ways:** 1. Artificial gene synthesis 2. Synthesis from mRNA 3. Cleavage from chromosomal DNA	
3773.	Complementary DNA is formed from	mRNA ETEA-2012
3774.	Gene of interest is cleaved from chromosomal DNA by	Restriction endonuclease ETEA-2008
3775.	**Some restriction enzymes are:** • EcoRI isolated from *Escherichia coli* • Hind II and Hind III from *Haemophilus influenza* • Xhol from *Xanthomonas holcicola*	

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3776.	The substrates for restriction enzyme are specific sequences of double stranded DNA called	Recognition sites or restriction sites
3777.	**Restriction enzyme produces one of the three different types of ends:** • 5' overhangs → Bam H1 cuts in this manner • 3' overhangs → Kpn 1 cuts in this method • Blunts → Sma1 cuts in this way	
3778.	**A DNA molecule should possess the following essential characteristics to act as cloning vector:** • Origin of replication • Selectable markers • Multiple cloning sites (MCS) or polylinker • Small size	
3779.	The most common markers used for the selection are the	Antibiotic resistant genes
3780.	If gene is present in bacteria it will show	Resistant to antibiotic
3781.	Ampicilline resistant gene is resistant to	Ampicilline antibiotic
3782.	All the unique restriction sites are grouped together in small region of a vector known as the	Multiple cloning sites (MCS) or polylinker
3783.	Relatively small vectors are more desirable because they increase the	Transformation efficiency and easy to manipulate **ETEA-2017**
3784.	**Types of cloning vectors are six:**	

Types of vector	Insert DNA size in kb
Plasmid cloning vectors	0.5 – 8
Bacteriophage cloning vectors	2.5 – 9
Cosmid-cloning vectors(combination of plasmid and phage DNA)	30 – 45
Yeast artificial chromosomes	250 – 1000
Bacterial artificial chromosomes	50 – 300
Animal and plant vector (shuttle vector)	>1000

3785.	The natural bacterial plasmid could be modified to produce new plasmid like	pBR322 **ETEA-2016**
3786.	The first widely used purpose built plasmid vector is	pBR322
3787.	**Useful features of pBR322:** • Origin of replication → pMBI fragment which is origin of replication • Size → 4,363bp • Copy number →15 copies per cell • Selectable marker →two antibiotic resistant genes(ampicillin and tetracyline) • Cloning sites	
3788.	There is room in pBR322 for an insert of at least	6 kbp
3789.	On pBR322, sites for Pse I, Pvu I and Sac I are found on	Ampicillin **ETEA-2010**
3790.	On pBR322, sites for Bam HI and Bam HIII are found on	tetracyaline
3791.	Cloning in one of the cloning sites inactivate the gene allowing recombinants to be differentiated from non-recombinants know as	Insertional inactivation

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3792.	DNA ligase is responsible for the phosphodiester linkage between two adjacent nucleotides and thus join two double stranded DNA fragment, therefore it is also called	Molecular glue **NMDCAT-2020**
3793.	A suitable organism that can act as host for the recombinant vector to express is called	Expression system
3794.	The ideal expression system is	Bacteria
3795.	**PROCEDURE OF RECOMBINANT DNA TECHNOLOGY**	
3796.	**Procedure of recombinant DNA technology:** • Formation of Recombinant DNA ➢ Digest vector to make it linear by endonuclease enzyme ➢ Isolate the DNA fragment by endonuclease enzyme ➢ Both DNA are bonded by DNA ligase. **NMDCAT-2020** This results recombinant DNA molecule of vector and gene of interest. • Transformation of expression system ➢ Put bacterial cells and recombinant plasmids into the same medium • Identification of transformed clone ➢ If resistant is shown to antibiotic it means that gene is inserted and live.	
3797.	Bacterial cells take up the recombinant plasmid, if they are treated with the	Calcium chloride
3798.	If resistant is not shown to antibiotic by recombinant DNA, then it means that	Gene is not cloned
3799.	**POLYMERASE CHAIN REACTION (PCR)**	
3800.	A technique by which we can generate thousand to millions of copies from single or few copies of piece of DNA is called	Polymerase chain reaction (PCR) **NMDCAT-2020**
3801.	Polymerase chain reaction was invented by Kary Mullis in 1983 and he was awarded by noble prize in	1993
3802.	Polymerase chain reaction (PCR) is based upon *in vitro* replication process by which it is carried out by	DNA polymerase enzyme
3803.	**Components of Polymerase chain reaction (PCR):** **NMDCAT-2020** • Template DNA • Deoxyribo-nucleoside tri-phosphates (dNTPs) • Primers • *Taq* polymerase	
3804.	The piece of DNA to be amplified or to be cloned is called	Template DNA
3805.	Deoxyribo-nucleoside tri-phosphates (dNTPs): these are free nucleosides that act as raw material for synthesis of new DNA fragments. **There are four different type of DNTPs:** • dATP • dGTP • dCTP • dTTP	
3806.	Temperature-tolerant enzyme isolated from *thermos aquaticus* is called	*Taq* polymerase
3807.	The PCR mixture is placed in an instrument called	Thermal cycler/ reaction mixture
3808.	**Mechanism of PCR reaction:** **ETEA-2017-18** • Denaturation (94⁰C for 1-5 min) • Primer annealing (54⁰C for 2 min)	

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	• Extension or polymerization (72°C for 1 min)	
3809.	Technique used for detection of specific infectious agents e.g. HBC, HIV,HCV is	Polymerize chain reaction
3810.	There is PCR-based cDNA synthesis know as	RT-PCR (reverse transcriptase PCR)
3811.	PCR has also shown its impact in	Criminology
3812.	**GENOMIC LIBRARY**	
3813.	A collection of bacterial or bacteriophages clones, each contains at least one copy of every DNA sequence in a genome of an organism is called	Genomic library
3814.	**To construct a genomic library, the genomic DNA of the organism is extracted and is cut into fragments of suitable sizes by any of the following three methods:** • Restriction enzymes. • Un-enzymatically by means of mechanical shearing such as sonication **ETEA-2012** • Partial enzymatic digestion with a restriction enzyme.	
3815.	A small, fluorescently or radioactively labeled DNA molecule that is used to locate similar or complementary sequences among a long stretch of DNA molecule or bacterial colonies such as genomic or cDNA or in a genome is called	A DNA probe **ETEA-2010-2017**
3816.	**DNA SEQUENCE**	
3817.	**The main principle of any DNA sequencing method is:** • To generate piece of DNA of different sizes all starting from the same point and ending at different points. • Separation of these different sizes pieces of DNA by gel electrophoresis • Reading of the sequences from the gel	
3818.	For generation of different size DNA fragments, the two different sequencing methods are: 1. Sanger method 2. Maxam-Gilbert method	
3819.	The widely used method and similar to the natural process of DNA replication is	Sanger method
3820.	Fredrich Sanger along with Andrew Coulson was awarded in 1977 by	Noble Prize
3821.	Sanger method is now become standard method because of its	Practicality
3822.	The key of sanger method is that all the reactions start from same nucleotide and end with	Specific base
3823.	In sanger method, bands of all different lengths are	Produced
3824.	The contents of each of the four tubes are run in separate plates on a polyacrylamide in order to separate	Different size bands from one another

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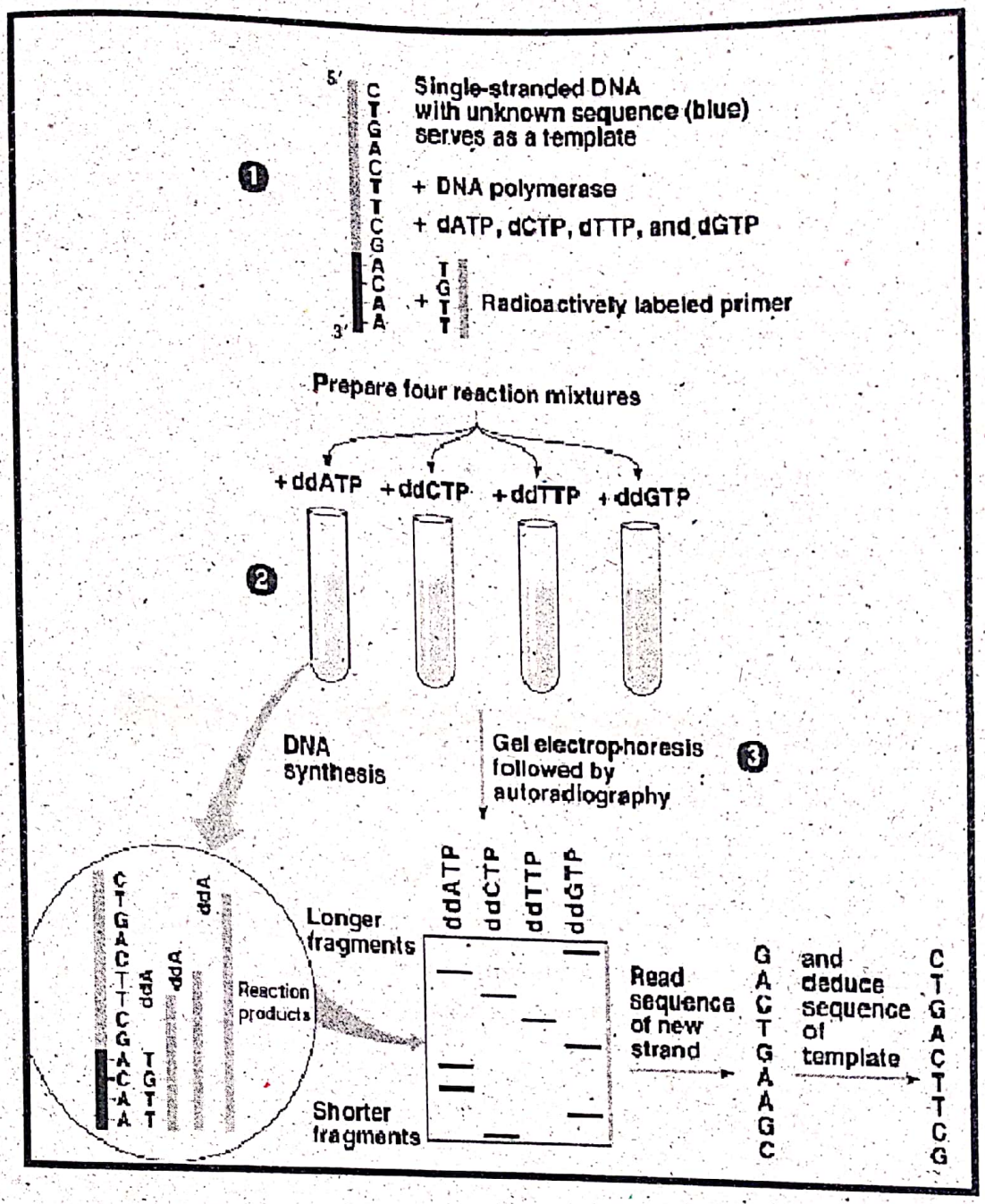
3825.



3826.	A technique used in molecular biology to separate charge bearing polymers under influence of magnetic field is called	Gel electrophoresis
3827.	DNA electrophoresis is used to separate DNA fragments primarily by	Size
3828.	The types of gel most commonly used to separate electrophoresis are; **ETEA-2014** • Agarose → for relatively large DNA molecules • Polyacrylamide → for high resolution of short DNA fragments	
3829.	At one end of the gel some partial holes are made which are called	Wells
3830.	In Gel electrophoresis, the DNA fragments migrate relative to its	Size
3831.	Distance a DNA travelled is inversely proportional to its	Length
3832.	Smaller fragments move faster through the gel matrix than	Larger matrix
3833.	**Although the movement of fragments also depends upon:**	

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	• Charges • Number of strands (single or double) • Shape of molecules (linear or circular) • Concentration of the gel (pore size)	
3834.	Bands cannot be viewed until they are labeled with	Florescent dyes or radioactive probes
3835.	There is no need for radiolabeling and auto radiography in	Automated DNA sequencing
3836.	In 1975-1977, Allan Maxam and Walter Gilbert developed a DNA sequencing method which is also called as	Chemical cleavage method
3837.	The DNA to be sequenced is end labeled by kinase treatment with	32P ATP
3838.	Dimethylsulphoxide (DMSO) is then added and the labeled DNA samples are heated with	90°C
3839.	The two strand of DNA are separated from one another by	Gel electrophoresis
3840.	One strand is purified and divided into four samples which are treated with Cleavage reagent and	Modifying chemical reagent
3841.	**The four samples taken from one strand are:** • G • A+G • T+C • C	
3842.	**DNA ANALYSIS**	
3843.	DNA analysis and DNA fingerprinting is an examination method that emerged in the 1980s and is credited to	Alec Jeffrey
3844.	Each species has a unique	Genetic sequences
3845.	A process by which we can identify any type of organism by analyzing its genetic sequences is	DNA analysis
3846.	**The first method used in DNA analysis is Restriction fragment length polymorphism (RELP). Key steps to make DNA by this process are:** • Collection of DNA samples • Placement of RELP • Separation of RELPs • Southern blotting • Autoradiography	
3847.	RELP refers to the different size fragments of DNA produced by a	Restriction enzymes
3848.	Every person has a unique set of	RELPs
3849.	Restriction site of particular enzyme is always different in Numbers and distribution in all humans except the	Monozygotic (identical) twins
3850.	In nucleotide sequences of genome, entire human have	99% similarity
3851.	1% difference in genome sequences that establishes the individuality	Of every person **ETEA-2017**
3852.	A method which routinely used in molecular biology for the detection of a specific DNA sequences in DNA samples is called	Southern Blot
3853.	Subsequent fragment detection is done by	Probe hybridization
3854.	The banding pattern, which was originally obtained in the gel due to the separation of the RELPs, is now developed on the	X-ray film
Application of DNA analysis to:		

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3855. Identify crime
3856. Identify relations
3857. Identify bacteria
3858. Match organ donor
3859. Identify potential suspects
3860. Determine pedigree for seed or livestock breeds
3861. Identify endangered and protected species

3862. **GENOME MAPS**

3863.	The collection of all genes present in one complete set of chromosomes is called	Genome
3864.	**In his marvelous book, Genome, Matt Ridley wrote that (→ means "is like a"):** ETEA-2012 • Human → Book • Chromosomes → Chapters(23) • Genes → Several thousand stories • Exons → Paragraphs • Introns → Advertisement • Codons → Words • Bases → Letters (A,G,C,T)	
3865.	**Commonly used DNA markers:** • RELPs → Restriction fragment length polymorphisms • VNTRS → variable number of tandem repeat polymorphism • SNPs → single nucleotide polymorphism • Microsatellite polymorphism	
3866.	The branch which deals with the exploration and analysis of complete DNA sequence of an organism's genome is called	Genomic
3867.	The first director of Human Genome Project(HGP) was	James D. Watson
3868.	The time of completion of project, the director of HGP was	Dr. Francis Collin
3869.	**Major goals of Human Genome Project(HGP) was:** • To identify 20,00 to 25000 genes of humans • To identify 3 billion chemical bases pairs of human DNA • Improve tools of data analysis • Address the Ethical, legal, and social issues (ELSI) that may arise from the project.	
3870.	**Benefits of Human Genome Project (HGP):** 1. **In molecular medicine** • Improve diagnosis of disease • Earlier detection of genetic predisposition to disease • Rational drug design • Gene therapy • Control system for drugs • Custom drugs 2. **In Bioarchaeology, Anthropology, Evolution and human migration** • Study evolution through germ line mutations in lineages • Study migration of different population groups based on female genetic inheritance • Study mutations on the y chromosomes to trace lineage and migration of males • Compare breakpoints in the evolution of mutations with ages of populations and historical events.	

3871. **TISSUE CULTURE**

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3872.	The propagation of plant part or single cell or group of cells in a test tube under very controlled and hygienic conditions is called	Tissue culture
3873.	The generic term used for both organ culture and cell culture is	Tissue culture
3874.	The initial plant part which is used to develop tissue culture is called	Explant
3875.	**On the basis of explant tissue culture is variously called as** • Cell culture • Organ culture	
3876.	**Procedure of tissue culture:** **ETEA-2016** • Sterilization • Media preparation • Inoculation • Development of callus • Development of plantlets	
3877.	Tissue culture is performed under	Aseptic conditions
3878.	The placement of explant onto the surface of solid culture medium	Inoculation
3879.	Explant is allowed to grow into and unorganized mass of cells called	Callus
3880.	A callus if formed when auxin and cytokinin are in	Balance **ETEA-2017**
3881.	**Types of tissue culture:** 1. Callus culture 2. Cell suspension culture 3. Protoplast culture 4. Meristem culture 5. Anther culture	
3882.	Any plant tissue can be used as an explant in	Callus culture
3883.	The cell suspension culture produce the same chemicals as the	Entire plant
3884.	**Cell suspension culture of:** **ETEA-2014** • Cinchona ledgiriana produce Quinone • Digitalis lanata produce digitoxin	
3885.	Protoplast are plant cells with the	Cell wall removed
3886.	Protoplast are most commonly isolated from either leaf mesophyll or	Cell suspensions
3887.	The synthesis of embryo that are developed from somatic cells	Somatic embryogenesis
3888.	Protoplast culture can be used to develop whole plants by organogenesis or	Somatic embryogenesis
3889.	The variation which are induced in somatic embryos by exposing it to chemical or physical mutagens	Somaclonal variations
3890.	The rapid dividing and growing tissues, especially found at the apices of roots and shoots in other part of some plants is called	Meristems tissues
3891.	A tissue culture in which meristems are used as explants is called	Meristem culture
3892.	For micropropagation and to obtains viruses or bacteria free plant we use	Meristem culture
3893.	If plant is infected, the meristem are not affected because it	Lake vascular tissues **ETEA-2012**
3894.	Anther culture is also called as microspore culture or	Pollen culture
3895.	A technique in which anther or microspores are cultured in a suitable medium to give rise to haploid callus by division and grown Finally into	Anther culture

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	haploid plant	
3896.	A diploid plant can also be obtained if chromosomal doubling is induced by the	Colchicine treatment
3897.	A cell culture which is initiated by the cells removed from an animal' organ is called as	Primary cell culture
3898.	Primary culture is subcultured in fresh media to establish	Secondary cultures
3899.	The culture of native tissues that retains most of the in vivo histological features is regarded as	Organ culture
3900.	The culturing of the cells for their reaggregation to form tissue like structure represents	Histotypic culture
3901.	Culture technique that involves the recombination of different cell types to form a more defined tissue or an organ is known as	Organotypic culture
3902.	**In animal cell culture the incubators are used to maintain:** • Oxygen • Carbon dioxide • Temperature • Humidity • Media with vitamins, amino acids and fetal calf serum	
3903.	**Synthetic media are of two types:** • Serum containing media • Serum-free media	

Applications of animal cell culture:

3904. Production of antiviral vaccine
3905. Production of monoclonal antibodies required cell lines in culture
3906. Production of pharmaceutical drugs using cell lines
3907. Chromosomes analysis
3908. Study of effect of toxin and pollutant using cell line
3909. Study the function of the nerve cell
3910. Use of artificial skin

3911.	**TRANSGENIC ORGANISM**	
3912.	Combining genes from different organisms is known as	Recombinant DNA technology NMDCAT-2020
3913.	**The resulting organism of recombinant DNA technology is termed as:** • Genetically modified (GM) • Genetically engineered (GE) • Transgenic	ETEA-2011-2013
3914.	Free living organism in the environment that have had a foreign gene inserted into them are called	Transgenic organism NMDCAT-2020 ETEA-2014
3915.	The first transgenic organism is	Bacteria (1973) ETEA-2010
3916.	Herbert Boyer(1978) inserted human insulin gene to *E.coli* to produce	Synthetic human insulin
3917.	**Genetically modified bacteria are used to produce:** • The protein insulin to treat diabetes • Clotting factors to produce haemophilia	

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	• Growth hormone to treat dwarfism • Tissue plasminogen activator (tPA) to treat thrombotic disorders • Interferon for treating viral infections	
3918.	Modifying *P. syringae* may have unexpected consequences for	Climate
3919.	Ice nucleating proteins may play an important part in causing	Ice crystal to form in cloud
3920.	The main issue regarding genetically engineered bacteria is that	New pathogen may created
3921.	The first field trials of genetically engineered plants occurred in	France and USA in 1986 **ETEA-2016**
3922.	→ as per estimates recorded in 2002, transgenic crop was cultivated world-wide on about 148 million acres 587 million hecters land by about 5.5 million farmers.	
3923.	→ the first gene available for genetic engineering of crop plants for pest resistance were Cry genes (popularly known as Bt genes) from a bacterium Bacillus Thuringiensis.	
3924.	**Some of the commercially transgenic plants in developed countries are:** • Roundup ready → soyabean • Freedon II squash • High-lauric → represeed (canola) • Flavr Savr • Endless summer → tomatoes	
3925.	The Dolly sheep was produced in	July 2002 **ETEA-2011**
3926.	Animal which carries a foreign gene that has been deliberately inserted into its gene is called	Transgenic animals
3927.	**Transgenic animals have the potential to improve human welfare in:** **NMDCAT-2020** • Agricultural • Medicine • Industry	
3928.	The model animal used in the field of transgenic is	Mice **ETEA-2006**
3929.	**The three principal methods used for the creation of transgenic animals are:** • DNA microinjection • Embryonic stem cell-mediated gene transfer • Retrovirus mediated gene transfer	
3930.	**BIOTECHNOLOGY AND HUMAN WELFARE**	
3931.	**Biotechnology is used in three different ways in the development of vaccine:** • Separation of a pure antigen using a specific monoclonal antibody • Synthesis of an antigen with the help of a cloned gene • Synthesis of peptides to be used as vaccines.	
3932.	The response of immune system to any antigen, even the simplest is	Polyclonal
3933.	Monoclonal antibodies (mAB) are a group of identical antibodies because they are made by	Identical immune cells
3934.	Monoclonal antibodies are typically made by fusing myeloma cells (cancerous B-lymphocytes) with the spleen cells from a mouse that has been immunized with the desired antigen. This technique is	Called somatic cell hybridization
3935.	The disease caused by protozoa and helminthes are diagnosed by	Monoclonal

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		antibodies and DNA probes
3936.	A technique for correcting defective genes responsible for disease development is called	Gene therapy

Researches may use one of several approaches for correcting faulty genes:

3937. Normal gene insertion for replacement of abnormal gene
3938. Abnormal gene can be swapped by homologous recombination.
3939. Repair the abnormal gene by selective reverse mutation
3940. Regulation of particular gene could be altered

3941.	The most common vector for gene therapy is	Virus
3942.	The generation of a functional protein product from the therapeutic gene restores the target cell to	Normal state
3943.	An inherited disease that affect mucus and sweat glands is	Cystic fibrosis (CF)
3944.	The cause of Cystic fibrosis (CF) is Cystic fibrosis transmembrane conductance regulator (CFTR) gene that encodes a protein which	Controlled water and salt movement of cells
3945.	The sure of Cystic fibrosis (CF) is Gene therapy of	Cystic fibrosis
3946.	The science of applied biological processes is	Biotechnology
3947.	The result of marriage of biological science with technology is	Biotechnology
3948.	**SCOPE AND IMPORTANCE OF BIOTECHNOLOGY**	
3949.	The result of marriage of microchips business technology is	Biochip
3950.	The size of microchip is about size of uncooked grain of	Rice
3951.	The symbiotic association between fungi and roots of higher plants is	Mycorrhiza
3952.	Biologically fixed nitrogen consumes about25-30% less energy than normally by chemical process, and this is called	Biofertilizers
3953.	The study and manipulation of material between 1-100 nanometers is called	Nanotechnology

Students of biotechnology after completing their studies can have scope in following fields:

3954. Communication/media
3955. Computer science
3956. Pharmaceutical companies
3957. Engineering
3958. Research
3959. Diagnostic laboratories
3960. Waste management
3961. Medicine
3962. Bio power plants
3963. Bio-processing industry
3964. Agricultural and animal husbandry
3965. Legal field
3966. Millitary
3967. Crime and law

3968.	Never to produce microbial or other biological agents or toxins, whatever may be their method of production, for use in wars	Biological weapon conventions of 1972
3969.	**Intellectual property includes:** • Patents • Trade secrets • Copyrights • Trademarks	

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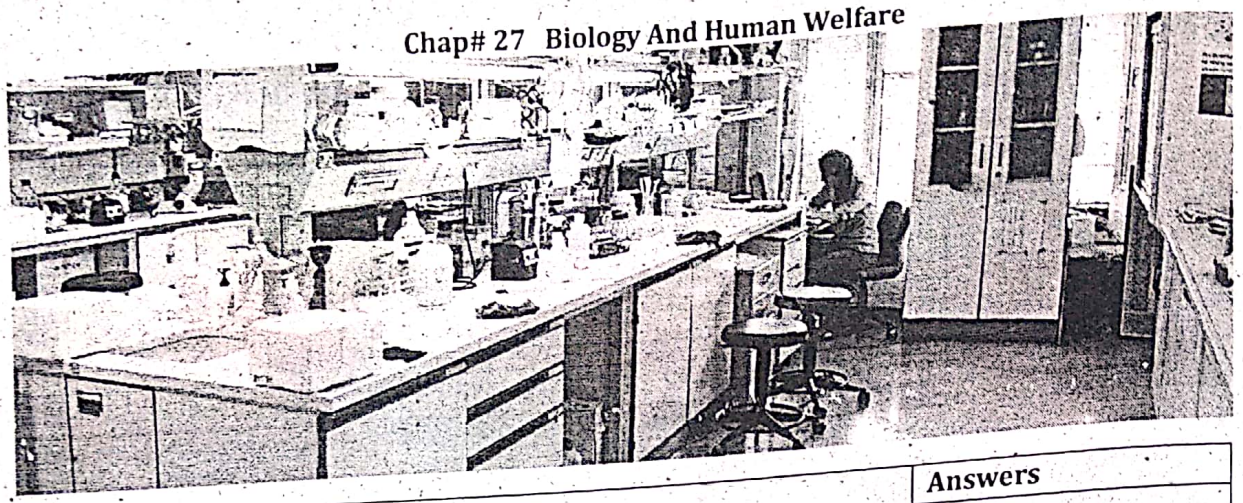
3970.	The collective term applied to a number of different types of legal rights granted by each country	Intellectual property rights (IPR)

Chap# 27 Biology And Human Welfare



S.No	Questions	Answers
	INTEGRATED DISEASE MANAGEMENT	
3971.	The people living on the planet earth are	7 billion
3972.	**In integrated disease management, every available method of disease control is used like** • Preventive measures • Drug treatment • Vaccination • Different kind of therapies	
	VACCINATION	
3974.	The administration of vaccine to stimulate the immune system of an individual to develop artificially induced active immunity against an infectious diseases is called	Vaccination
3975.	The first scientist who develop vaccine against small pox in 1796	Edward Jenner **ETEA-2016**
3976.	Edward Jenner insert liquid of cowpox and inserted it to the boy of age 8 years and name James Philip, the boy	Did not suffer from disease
3977.	The bacteria which inserted by Louis Pasteur to chicken which develop immunity against the disease instead of causing the disease was	Foul cholera
3978.	The word vaccine is derived from Latin word "**vacca**" which means	Cow
3979.		

	Vaccine	Characteristics	
3980.	Live, attenuated vaccine	Good "teachers" of immunity system	
3981.	Inactivated or killed vaccine	More stable and safe but weaker than live vaccines.	
3982.	Subunit vaccine	Lower adverse reactions	**ETEA-2017**
3983.	Toxoid vaccine	Used for disease which is mainly caused by bacterial toxin.	
3984.			

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Types of vaccines: ETEA-2011

	Vaccine	Examples of vaccines used for
3985.	Live, attenuated vaccine	Yellow fever, measles, rubella, mumps, bacterial disease typhoid
3986.	Inactivated or killed vaccine	Influenza, cholera, bubonic plague, polio, hepatitis A, Rabies
3987.	Subunit vaccine	Hepatitis B
3988.	Toxoid vaccine	Diphtheria and tetanus
3989.		**ETEA-2019**

3990.	A vaccine that contain a version of the living microbe that has been weakened in the lab so its cant use disease	Live, attenuated vaccine
3991.	By killing the disease causing microbe with heat, chemicals or radiation, such vaccines are more stable and safer and are called	Inactivated or killed vaccines
3992.	Instead of entire microbe, subunit vaccines include only the antigens that best stimulates the immune system, this vaccines are called	Subunit vaccines
3993.	For bacteria that produces toxins or harmful chemicals, the vaccine use for it is	Toxoid vaccines
3994.	A detoxified toxins are called	Toxoids
3995.	Toxins can be inactivated by treating them with	Formalin
3996.	A solution of formaldehyde and sterilized water is called	Formalin

SCHEDULE OF VACCINES AGAINST COMMON DISEASE:

3998. **Schedule of vaccines against common disease: ETEA-2011-2016**

Disease	Vaccine	Type	Age group
Polio	OPV (Oral Polio Vaccine)	Live	Birth- 5 years
Tuberculosis	BCG (Bacillus Calmette Geurin)	Live	At birth
Typhoid	Typhoid vaccine TAB vaccine (Typhoid Paratypoid A and Partyphoid B)	Kill	2 years of age
Hepatitis	Hepatitis B vaccine	Subunit	Any age
Diphtheria & tetanus	Diphtheria toxoid vaccine Tetanus toxoid vaccine	Toxoid	childhood

ANIMAL HUSBANDRY

3999.	The branch of science which deals with the study of various breeds of domesticated animals and their management for obtaining better product and services is known as	Animal husbandry
4000.	The term husbandry is derived from the word "husband" which means	One who take care
4001.	The study of proper utilization of economically important domestic animals, it is called	Livestock management
4002.	The people of Pakistan who are engaged in livestock are	30-35 million

4003. **Different categories of animals or livestock:**

Type	Characters	Examples
Wild	Breed better when free No common use for humans	Lion, tiger

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	Tamed	Caught from wild and are trained to useful for humans	Elephant, chimpanzee, gorilla, Yak
	Doinesticated	Use at home and are easily look after by humans	Dog, horse, cow, sheep, buffalo, fowl

4005. **Importance of domestic animals :**

Type	Example
Milk yielding animals	Cattle, buffalo, goat, sheep
Draught animal s	Horse, donkey, mule, camel , yak, buffalo ETEA-2018
Fibre, hide and skin yielding animals	Sheep, goat, buffalo, camel
Meat and egg yielding animals	Fowl, duck, goat, buffalo

4006.	The first animal domesticated by man for agricultural use are	Cattle ETEA-2010

4007. **Milk and meat yielding animals :**

- Male → labour, meat and hide
- Females→ milk(ghee, curd, butter and cheese)

4008.	Milk drawn from animals are known as	Full cream milk
4009.	When cream is separated from the milk, the remaining milk is called	Toned milk
4010.	The milk containing no fat is called	Skimmed milk

4011. **On the basis of fat contents the various milk products are as follow:**

- Cream → 10-70% fat content
- Curd → made from milk by bacterial activities
- Butter milk → left over milk after removal of butter
- Ghee → produced by heating butter (100% fat content)
- Condensed milk → produced by removing water from milk(31% milk and 9% fat)
- Powdered milk →powder form of milk
- Cheese →coagulated milk protein-casein with fat and water
- Khoya → by water evaporation and by reducing bulk to 70-75%

4012.	Draught animals are animals need for	Carrying load
4013.	Rearing and keeping of birds such as fowl, duck and hen for egg and meat is called	Poultry.farming
4014.	In the era of animal husbandry, the silver revolution is broght by	Increase in production of eggs
4015.	The collection of semen from a healthy bull of desired breed, its storage at low temperature and introduction to the females of cattle of other breeds for bringing about fertilization is called	Artificial insemination

4016. **Advantages of artificial insemination are:**

- 3000 females can be fertilized from semen of one bull
- Semen can be stored
- High success rate of fertilization

4017.	The method of embryo transplant are quite successful in	Sheep and goat
4018.	Out of artificial insemination and embryo transplant, the most successful is	Artificial insemination

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4019.	**LATEST TECHNIQUES USED FOR PLANTS**	
4020.	**Techniques is used for plants to get:** • Increased quality of crop • Increased quantity of crop • Increase tolerance of plant to environmental pressures • Increase resistivity to viruses, fungi and bacteria • Increase tolerance to pests • Increases tolerance to herbicides	
4021.	**The classical techniques for plants:** • Protoplast fusion • Embryo rescue • Mutagenesis **Some of the modern techniques for plants are:** • Acclimatization • Selective breeding • Hybridization • Genetic engineering	
4022.	The process of an individual organism adjusting to a gradual change in its environment allowing it to maintain performance across a range of environmental conditions are called	Acclimatization
4023.	Acclimatization occurs in small period of time	From days to weeks
4024.	In response to change in temperature, organisms can change the biochemistry of call membrane making them • More fluid in cold temperature • Less fluid in warm temperature By using number of membrane proteins.	
4025.	Protein that assists non-covalent folding are called	Chaperons
4026.	The specific proteins which help the cell to maintain function under periods of extreme stress are called	Heat shock proteins
4027.	Many plants such as maple trees, tomato plants and irises can survive if temperature gradually drops low and low an if drop occur suddenly	It may kill the plants
4028.	The art and science of changing the genetics of plats in order to produce desired characteristics, this process is called	Selective breeding
4029.	Classical plant breeding uses deliberate interbreeding (crossing) of closely or distantly related individuals to produce new crop varieties or lines with desirable properties, this process is called	Hybridization and backcrossing
4030.	By hybridization, by crossing mildew-resistant pea may be crosses with high-yielding to get	Mildew with high resistant pea
4031.	Insect resistance is achieved through incorporation of a gene from	*Bacillus thuringiensis*
4032.	The enzyme that the herbicide inhibits are known as the	Herbicides target sites
4033.	**ROLES OF MICROBES IN HUMAN WELFARE**	
4034.	**Lactose are present in milk which are converted into lactic acid by:** • *Streptococcus salivarius* • *S. thermophiles* • *Lactobacillus bulgaricus*	

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	These bacteria are collectively known as lactic acid bacteria or LAB	
4035.	The solid part of milk produced by coagulation is known as curd and the liquid is known as	Whey
4036.	Coagulation can be controlled by using	Rennet tablets
4037.	The rennet tablets contain an enzyme called	Renin
4038.	The conversion of sugar to ethanol and carbon dioxide is known as	Alcoholic fermentation
4039.	**Depending on the type of sugar, different types of alcohol can be made:** • Beer is prepared by fermentation of maltose by yeast • Wine is made from the fermentation of grape sugar by yeast	
4040.	Beer is brewed from barely grain, which is partially germinated to convert starch into maltose, this process is called	Malting
4041.	To speed up the process of germination and to increase the germination and to increase the amount of sugar to produce more alcohol, we use	Gibberellins and amylase
4042.	The liquid obtained from crushing of grain and by adding water to it	Wort
4043.	Next to wort is fermented by the yeast to produce	Alcohol
4044.	Insulin is commercially produced by	Transgenic *E.coli*
4045.	The two main **advantages of preparing insulin** by recombinant DNA technology as: 1. It is chemical identical to human insulin 2. We can get it in unlimited quantities	
4046.	Penicillin is obtained from	*Penicillium* fungi
4047.	Cyclosporine is produced from	Trichoderman polysporum fungus
4048.	Lovastatin is produced by the yeast	*Monascus purpureas*
4049.	Penicillin is not produced during	Active growth
4050.	The blood cholesterol lowering agent is	Lovastatin
4051.	An immune suppressive agent used in organ transplant patients is	Cyclosporine
4052.	Biogas is **50-75%** methane and the rest are	Carbon dioxide + other gases **ETEA-2018**
4053.	The bacteria used for the production of methane from carbon and hydrogen is	Methanogens
4054.	The solid waste that is taken out from the settling tanks at various stage in sewage treatment plants is called	Activated sludge
4055.	The bacteria which help in the breakdown of cellulose is	Methanobacteria
4056.	Biogas is also known as	Gobar gas

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Chapter No.1 Cell Structure and Functions

4057. Resolution of light microscope	250 nm
4058. Resolution of eye	500X
4059. Human eye can differentiate	1.0 mm
4060. Light microscope magnification	10,000 times
4061. TEM magnification	1 million
4062. SCM	3D image
4063. Centrifugation	G→800,20k,100k,150 T→10,15,60,3hour
4064. Freezer	-20 degree
4065. Thickness of middle, primary and secondary	1,1-3,5-10 (micrometer)
4066. Robert hook discover cell wall in	1665
4067. Plasma membrane lipid	20-40%
4068. Plasma membrane proteins	60-80%
4069. Gorter and Grendel → two layers of lipids	1925
4070. Dinelle and devon → lipid bilayer covered with proteins and pores	1935
4071. Reoberston → unit membrane model	1959
4072. Singer and nicholson→ fluid mosaic model	1972
4073. Plasma membrane wideness	7 nm
4074. Water in cytoplasm	90%
4075. Ribosome diameter	20nm
4076. Palade discovered ribosomes in	1955
4077. Prokaryotic ribosomes	70S
4078. Eukaryotic ribosome	80Sv
4079. 70S ribosome made of	30 and 50
4080. 80S ribosomes is made of	40 and 60
4081. Golgi apparatus	1898
4082. De Duve → lysosome	1949
4083. Peroxisome diameter	0.5 micro meter
4084. Kirchoff → cytoskeleton	1928
4085. Cohen →confirmation cytoskeleton	1977
4086. Centriole width	0.2 micrometer
4087. Centriole length	0.3-0.5 micrometer
4088. Microtubule in centriole	9
4089. Tubules in centriole	9x3=27
4090. Mitochondria discovery	1850
4091. ATP production by cellular respiration	38
4092. Robert Brown → Nucleus	1838
4093. Thylakoids forming granum	50 or more

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4094. Number of chromosomes	
Drosophila	8
Garden pea	14
Onion	16
Frog	26
Man	46
Chimpanzee	48
Potato	48
pigeon	80

Chapter No.2 Biological Molecules

4095. C,H,O in human body are	95%
4096. Water-enzymes hormes-inorganic ions in bacterial cell and in mammalian cell	70-2-1 %
4097. Carbohydrate in bacteria and mammalian cell	3,4
4098. lipids in bacteria and mammalian cell	2,3
4099. DNA in bacteria and mammalian cell	1, 0.25%
4100. RNA in bacteria and mammalian cell	6, 1.1 %
4101. Living organ body contain water	70-90 %
4102. Water oils without H-bond	-80 degree C
4103. Water freezes without H-bond at	-100 degree C
4104. Water is heavy at	4 degree C
4105. Carbon in monosaccharides	3-7
4106. Glucose in 100 ml blood	100 mg
4107. Glucose in grapes	27%
4108. Amino acid types	20
4109. Polypeptide chains in haemoglobin	4
4110. Polypeptide chains in insulin	2
4111. Sanger →insulin molecule structure	1951
4112. Carbon in fatty acids	16-18
4113. Triglyceroids energy	2 x carbohydratic energy
4114. Carbon in steroids	17
4115. Energy given by one ATP	-7 Kcal
4116. Structure of DNA → Watson – Crick – Willikan	1953
4117. DNA diameter	2nm
4118. Pair distance in DNA	0.34 nm
4119. Griffath experiment	1928
4120. Avery, Mcleod and Mccorty experiment	1844
4121. Genetic codes	64

Chapter No.3 Enzymes

4122. Fischer → lock and key model	1890
4123. Activation energy without catalyst→ H_2O → O+OH	86 KJ
4124. Activation energy in catalyst→ H_2O → O+OH	1 KJ
4125. Optimum temperature for mammalian enzyme	40 degree C
4126. Optimum temperature for arctic snow flea	-10 degree C

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4127. Optimum temperature for thermophilic bacteria	90 Degree C
4128. Protease pH	1
4129. Pepsin pH	1.5-1.6
4130. Invertase pH	4.5
4131. Catalase, Urease pH	7.0
4132. Trypsin pH	7.8-8.7
4133. Lipase → castor oil, pancreas, stomach	4.0 – 5.0 , 4.7, 8.0 (40 50 47 80)
4134. Maltase pH	6.1-6.8
4135. Amylase → malt and pancreas	4.6-5.2 and 6.7-7.0

Chapter No.4 Bioenergetics

4136. Eyes are sensitive to	390-760 nm light
4137. Light enters to atmosphere	40 %
4138. Chlorphylls absorb violet blue light of wavelength	390-430 nm
4139. chlorophyll absorb also red light of wavelength	670-700 nm
4140. carotenoid absorb light of wavelength	600-700 nm
4141. Chlorophyll a → methyl	C55 H72 O5 N4 Mg
4142. Chlorophyll b → carbonyl	C55 H70 06 N4 Mg
4143. Vane Neil → water gives oxygen	1930
4144. Van Neil supported by Hill	1937
4145. Photosystem 1 absorb light of	700 nm
4146. Photosystem 2 absorb light of	680 nm
4147. ATP produced in light reaction	1
4148. NADPH produced in light reaction	1
4149. Melvin Calvin → Dark reaction	1950
4150. Net gain of ATP in glycolysis	2
4151. ATP produced in glycolysis	4
4152. NADH produced in glycolysis	2
4153. $NADH_2$ produced in single linked reaction	1
4154. $NADH_2$ produced in linked reaction	2
4155. $NADH_2$ produced in single Kreb's cycle are	3
4156. $FADH_2$ produced in single Kreb's cycle are	1
4157. ATP produced in single Kreb's cycle	1
4158. Overall production in Kreb's cycle	8 $NADH_2$, 2 $FADH_2$ and 2 ATP
4159. 9 acetyl group generates	108 ATP
4160. 1 acetyl group generate	12 ATP
4161. ATP produced in Anaerobic respiration	2

Chapter No.5 Acellular Life

4162. Virus replication time	70 sec
4163. Bacteria replication time	20 min
4164. Virus discovery → Iwanosky	1892
4165. Virus form blisters	1898

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4166. Virus nature determined	1935
4167. Size of virus	24-200 nm
4168. Head of virus sides	20 sides
4169. HIV size 100-150 billionth of metre. 0.1Micron , 4 millionth of inch, One twienth of E.coli , One seventienth of diameter of human CD4 cell	
4170. spikes on HIV	72
4171. spike made of	Gp 141 and g120
4172. matric made of	p17
4173. core made of	p24
4174. RNA in HIV	2 identical
4175. HIV genes	9
4176. Human genes	20,00-25,000
4177. Bacterium genes	500
4178. Anti HIV medicines combines in HAART	3 or more
4179. Incubation period of Leaf curl disease Hepatitis A Hepatitis B Hepatitis C	 2-3 weeks 2-6 weeks 4-20 weeks 2-26 weeks
4180. Medicine for Hepatitis C for children	1
4181. Two drugs for Hepatitis C for adults work upto	50 %
4182. Incubation period for polio	5-35 days (average 7-14 days)
4183. Immunization for polio effective upto	90 %

Chapter No.6 Prokaryotes

4184. Scientific names of prokaryotes	6300 species
4185. Dr. Carl → Bacteria and archeae domains	1970
4186. Extremophile bacteria	90 degree C
4187. Bacteria by Leeuwenhoek	1618
4188. Oxygen level raised from	1 % to 21 %
4189. Hans Chrisitan Gram → experiment	1884
4190. Length of bacteria	2-10 micrometer
4191. Diameter of bacteria or width	0.2-2 micrometer
4192. E.coli generation time	20 min
4193. Time of bacteria to cover earth surface	36 hours
4194. Conjugation → Lederberg and Tatum	1946
4195. Transduction → Lederberg and Zinder	1952
4196. Incubation period → bacterial wilt	2-3 days
4197. Temperature (In degree C)and time High Temperature Short Time(HTST) pesturization Ultra High Temperature Heating Inceneration	 72 →15 sec 140 →3 sec 100 →10 min 170 → 2 hours
4198. Refrigeration temperature	0-7 degree C
4199. Ethylene oxide kill microbes in	4-18 hours

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Chapter No.7 Protista and Fungi

4200. Protest species	60,000 – 2 Lac
4201. Autotrophic genera of euglenozoids	40
4202. Height of some kelps	100 m
4203. Irish Potato Famine	1845-1847
4204. People die in Irish potato famine	4 Lac
4205. Potato Famine in Ireland	1840s
4206. Armillaria Ostoyae area	8.9 km^{-2}
4207. Armillaria Ostoyae weight	100 tons
4208. Armillaria Ostoyae old	1000 years
4209. Ascomycota forming lichen	More than 40%
4210. Protein in yeast	50 %
4211. Genes of yeast	6000
4212. Mycorrhizae relations	80 %
4213. Fruit harvest cause by fungal diseases	50 %

Chapter No.8 Diversity Among Plants

4214. Dicotyledons	2 Lac
4215. Monocotyledon	50 thousand
4216. Gymnosperm	700
4217. Algae	18 thousand
4218. Fungi	80 thousand
4219. Height of moss plant	2.7 cm
4220. Selaginella species	300
4221. Filicinea species	10 thousand
4222. Seed cotyledons	1 to many
4223. Xylem in dicotyledon	2-6
4224. Monocotyledon xylem	5-8
4225. Size of wolfia	1 mm
4226. Size of eucalyptus	100 m
4227. Spermatocytes has	300 families 12500 genera 3 Lac species

Chapter No.9 Diversity Among Animals

4228. Food of porifera as decaying organic matter	80 %
4229. Predatory sponges depth of	5000 m
4230. Physalia pelagica speed	12.1 cm
4231. Barrier reef widness	180 feet to 3 mile wide
4232. Term Platyhelminthes by Gaugenbaur	1859
4233. Great Barri cer Reef length	1250 miles (2012 km)
4234. Planaria length	10 mm
4235. Tape worm length	16 feet or 5 meter
4236. Platyhelminthes species from mm to many feet	15 thousands
4237. Male Ascaris length	6-12 inch

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4238. Female Ascaris length	8-12 inches
4239. Eggs at one time in Ascaris	27 million
4240. Ascaris lay egg per day	2 Lac
4241. Mollusks living species	80,000
4242. Mollusks fossils species	35,000
4243. Total mollusks species	115,000
4244. Members of Onychophora	70 species → 10 genera
4245. % of fishes in vertebrate	48%
4246. Number of living fish	29000
4247. Pair of gills in class chondrichthyes	5-7
4248. Fish sub class Dipnoi	3 species
4249. Mesozoic period	225-65 million year back
4250. Jurassic period	195-136 million year back
4251. Cretaceous period	136-65 million year back
4252. Prototheria or monotremata temperature	25-28 Degree C

Chapter No.10 Form and Functions in Plants

4253. Lime raise soil pH	6.0 to 6.5
4254. Water loss by transpiration	90 %
4255. Tracheids widness	80 micro meter
4256. Long day→ critical day length	11 hours
4257. Short day→ critical day length	15 ½ hours
4258. P_r absorb red light	660 nm
4259. P_{fr} absorb far red light	730 nm
4260. Florigen produced in leaves →M.H.Chailkhain	1936
4261. Vernalization effective temperature	4 Degree C
4262. Vernalization applied to wheat in Northern Europe	1930-1940

Chapter No.11 digestion

4263. Mouth to stomach food time	4-8 seconds
4264. Stomach volume	
Empty	50 ml
Capacity	1 L
Maximum capacity	4 L
4265. Gastric juice produced at each meal	400-800 ml
4266. H+ concentration in stomach	0.15 M
4267. Stomach pH	Less than 1
4268. Gastric juice pH	1-3
4269. When food not reached to stomach, Gastric juice secreted	¼ th
4270. Small intestine length	17 feet
4271. Large intestine length	5 feet
4272. Duodenum length	10 inch
4273. Jejunum length	4-5 feet
4274. Ileum length	5-7 feet
4275. Time takes by food from stomach to duodenum	4-5 hours
4276. Small intestine diameter	9-12 cm

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4277. Large intestine diameter	3-4 cm
4278. Gastrocolic reflex	2-3 times a day
4279. Anal canal length	1.5 inch
4280. Acinar cells and ducts pancreatic mass by	80-90 %
4281. Acinar cells acinus	20-40
4282. Islets of Langerhans	2 %
4283. Amylase pH	7
4284. Lipase pH	7-9
4285. Wait gain after pregnancy	4-6 pound
4286. BMI	
Normal	18.5-24.9
Overweight	25.0-29.9
Obese	30 or greater
Morbidly obese	40 or greater
4287. In BMA weigh in pound is multiplied by	705
4288. Heightx705 is divides by	Height in inches 2 times
4289. Exercise time for obesity treatment	30 min

Chapter No.12 Circulation

4290. Cardiac cycle time	0.8 sec
4291. Systole time	0.1 sec
4292. Diastole time	0.4 sec
4293. Normal heart rate	72 per min
4294. Increased beats	120 per minute
4295. Time for stimulus spreading through arterial surface	50 m sec
4296. Delay at AV node	100 m sec
4297. Arterial contraction begins and delay at AV node	150 m sec
4298. Stimulus reached from AV to right ventricle	175 m sec
4299. Impulse spreading throughout ventricular myocardium	225 m sec
4300. Blood speed in aorta	425 cm/sec
4301. Blood speed in capillary	Less than 1 mm/min
4302. Rate of ECG paper	25 mm per second
4303. For ECG	Imm = 0.1 mV
4304. Diameter of arterioles	3mm – 10 micrometer
4305. Capillary diameter is more than RBCs which is	7.5 micro meter
4306. Pressure in artries	100 mm Hg
4307. Pressure in Veins	2 mm Hg
4308. Venules diameter	8-100 micrometer
4309. Capillary length	60,000 miles
4310. 1 mile =	1.602 Km
4311. Capillaries volume	5 Liters
4312. Capillary surface area	800-1000 m^{-2}

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4313. Showing blood flow in mm/min.

Organ	At rest	Exercise
Heart	250	750
Brain	750	750
Kidney	1200	600
Viscera	1400	600
Skeletal muscles	1000	12500
Skin	400	1900
Other	600	400
Total	5600	17500

4314. Blood pressure in different blood vessels;

Name of vessel	Systolic B.P	Diastolic B.P	B.P
Aorta	120	80	
Arteries	102	60	
Arterioles	60	45	
Capillaries			40
Venules			20
Veins			10
Vena cava			0

4315. B.P inn capillaries	40 mm
4316. B.P when blood leaves arteries	20 mm
4317. Term embolus coined by Rudolph Carl Virchow	1848
4318. Hypertension, smoking increase risk of arteriosclerosis by	7 times
4319. Normal B.P	120/70
4320. For normal adult, hypertensive is	130/90
4321. Above 45 years, hypertensive man B.P Hypertensive woman B.P	 146/95 140/95
4322. 5-6 mmHg can decrease the risk of stroke by heart disease by	 40 % 15-20 %
4323. Water pressure of balloon catheter	75 to 500 times
4324. Normal pressure	6-20 atmosphere
4325. First coronary artery bypass	May, 2 1960
4326. Replacement of blocked coronary artery	1867
4327. First successful heart surgery → Dr. Ludwig	September 7 , 1896
4328. First successful intracardiac correction	September 2, 1952
4329. Successful graft typically lasts for	10-15 years
4330. Firstly lymphatic ducts described in liver	1630-1702

Chapter No.13 Immunity

4331. Amino acids in Variable region of antibiotics	110-130

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4332. Chance of allergy;	
If neither parents are affected	15 %
If one parent is affected	30 %
If both parent are affected	45 %

Chapter No.14 Respiration

4333. Respiratory surface thickness	1mm or less
4334. Trachea length	10-12 cm
4335. Trachea widness	2 cm
4336. Trachea rings	16-20
4337. Bronchioles diameter	1 mm or less
4338. Alveoli thickness	o.1 micormeter
4339. Alveoli in lungs	700 million
4340. Area of alveoli	70-90 m
4341. Right lung volume	56 %
4342. Left lung volume	44 %
4343. Lung capacity	5 liters
4344. Tidal volume	500 ml
4345. Residual volume	1.5 liter
4346. Decrease in oxygen that doubles breathing rate	20 %
4347. Oxygen transport as oxyhaemoglobin	97 %
4348. Oxygen transport in plasma state	3 %
4349. Hb combines with	4 O_2

Oxygen in	Capacity	Pressure of PO_2	Saturation
Arterial blood (maximum)	20 ml /100 ml	100 mm Hg	100 %
Arterial blood (normal)	19.4 ml/100 ml	95 mm Hg	97 %
Venous blood (normal)	14.4 ml/100 ml	40 mm Hg	75 %

4350. The amount of oxygen released to tissues by each 100ml blood is	5ml of oxygen
4351. During exercise venous blood that leave an active tissues has 4.4 ml	At 18 mm Hg (20% sat)
4352. In dissolved form 100 ml of artery blood contain 0.29 ml O_2 (95 mmHg) and increase to	0.3ml/100ml at 100 mmHg
4353. In plasma in dissolved form 100 ml of venous blood contain 0.12 ml of dissolved oxygen at	40 mmHg
4354. The oxygen transported to tissues per cycle in dissolved state is	0.17 ml of oxygen

4355. Carbon dioxide is carried in the blood

As	%age
Bicarbonate ions	70 %
Carboxyhaemoglobin	23 %
Plasma	7 %

4356. Acute symptoms of Sinusitis appear in	2 - 8 weeks
4357. 80% of otitis media clear up within	3 – 4 days

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4358. The percentage of water in animals is	70%
4359. Osmolarity of sea water is	1000 mos m/L
4360. Osmolarity of blood of marine animals is	200-300 m/L

4361. **Into nontoxic form, amount of water requires to dissolve 1g of:**

Substance	Water amount
NH_3	500 ml
Urea	50 ml
Uric acid	1 ml

4362.

4363. Urea is 1 lac time less toxic than	Ammonia (NH_3)
4364.	
4365. The length, width and thickness of kidney is	12cm 6cm 4cm
4366. The weight of stomach is about	150 gms
4367. The blood received by kidney from heart is	20%
4368. The rate of blood flow through kidney is	1.2 liter per minute
4369. Kidney 12 cm long	
4370. Ureter 28 cm long	
4371. Urethra (female) 2-3 cm long	
4372. Urethra (Male) 20 cm long	
4373. The storage of urinary bladder is	0.5 to 1 liter
4374. Lower part of urinary bladder is guarded by	2 sphincters
4375. Each human kidney contain	1 million nephrons
4376. **Two general classes of nephron are:**	
4377. Cortical → 70% - 80%	
4378. Juxtamedullary →20% -30%	

4379. Percentage of types of stones of stone formation:

Stone type	% age
Calcium with oxalate/phosphate	70 %
Struvite or infection stone	20 %
uric acid stones	5-10 %
amino acid cysteine stones	1-3 %

4380. The stone which can passes from kidney is under	0.5 cm
4381. The stone which cannot pass from kidney have greater than	1 cm
4382. First successful kidney transplantation took place between two twins in	1954
4383. The recipient of transplant kidney can expect to live for	5-20 years
4384. Transplant surgeon like to see HLAs matching of	3 or more HLAs
4385. The number of Human Leucocyte Antigens(HLAs) in humans are	6
4386. The temperature of structures below the skin and subcutaneous tissue	36.4 – 37.3 °C
4387. Heat is lost from body in process like conduction, convection and	Radiation (50%)

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Chapter No.16 SKELETON AND MUSCLES

4388. Osteoblast produce a matrix which is mainly composed of	**Type I collagen**
4389. The composition of **organic material** in matrix in in bone cells	**30%**
4390. The composition of **inorganic material** in matrix in in bone cells	**70%**
4391. Matrix is composed of collagen fibers (90%) and	Glycoproteins **(10%)**
4392. Bone matrix contain	Type I collagen
4393. Cartilages mostly contain	Type II collagen
4394. The number of bones in babies are	**350**
4395. The number of bones in adult stage are	**206**
4396. The number of bones in skull	**22**
4397. The number of vertebrae in human	**33**
4398. Arthritis is leading cause over the age of	**65**
4399. For simple fracture the healing time is	**6-8 weeks**
4400. Bony callus formation continues until a firm union is formed	About **2 months later**
4401. The total no of muscles in human are	**650**
4402. The muscles fibres are cylindrical, unbranched and with diameter	Of **10-100 µ m**
4403. The diameter of muscle fibre is	**10-100 µ m**
4404. The diameter of myofibrils is	**1-2 µ m**
4405. The energy utilized for muscular contraction is	**35%**
4406. In the spore form clostridium tetani can remain infectious for	**40 years**

Chapter No.17 NERVOUS COORDINATION

Questions	Answers
4407. The potential in rest with inside negative to outside positive is	**-70 millivolts**
4408. Concentration of K^+ inside to fluid to outside is	**30 times**
4409. Concentration of Na^+ in outside to inside is	**10 times**
4410. when **2 K^+** are active transported inward the number of Na^+ transported	Outward is **3** (energy use)
4411. Due to diffusion of Na^+,electric potential from -70mV towards 0 and then reach to the	50mV
4412. Average speed of nerve impulse is	**100-120** m/s
4413. The speed of nerve impulse is 20 time faster in myelinated neuron fiber due to	Salutatory conduction
4414. In electrical synapse the synaptic cleft is of	**0.2** nm
4415. In chemical synapse the synaptic cleft has gap of more than	20nm
4416. Synaptic knobs contain synaptic vasicles which contain 10,000	Neurotransmitter substance
4417. The length of spinal cord	**18 inch**
4418. The width of spinal cord	**0.5 inch**

4419. **The total number of spinal nerves are 31. Which are grouped as:**

Nerves	No
Cervical	8

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4420.

Thoracic	12
Lumbar	5
Sacral	5
Coccygeal	1

4421. **The total number of pairs of cranial nerves are 12, Functionality:**

Sensory nerves	1, 2, 8
Motors nerves	3, 5, 6, 11, 12
Mixed nerves	4, 7, 9, 10

4422. The total types of olfactory receptor proteins are about	4423. **1000**
4424. The fingertips and tongue have as touch receptors as	4425. **100 per cm²**
4426. The back of hand have as touch receptors as	4427. **10 per cm²**
4428. An adult can be killed by nicotine by an amount of	4429. **60 mg**
4430. In cigarette if nicotine is 60mg then number of cigarette is	4431. **4**
4432. Alzheimer's disease increase substantially after the age of	4433. **70**
4434. Alzheimer's disease may effect around 50% of persons over the age of	4435. **85**

Chapter No.18 CHEMICAL COORDINATION

4436. Pituitary gland is pea shaped and gray colour and its weight is	**0.5g**
4437. The number of glands in endocrine system are	**20**

Chapter No.19 BEHAVIOR

4438. Some organism do not function at constant rate over the entire	24 hours of the body
4439. Spider monkeys form loose group of	15 – 20 Animals
4440. Spider group divide into small group of about	2 – 8 Animals
4441. In altruism, female baboon protects and cares for its offspring	For **6 years**

Chapter No.20 REORODUCTION

4442. The science of genetics originated in the year 1900 with the rediscovery of an article originally published in 1866 by an	Augustinian monk named Gregor john Mendel
4443. Mendel was born on July 22, 1822 in	Czech Republic
4444. Between 1856 and 1863,Mendel carefully analyzing the seven pairs of seed and plant characteristic and cultivated and tested about	28,000 pea plants
4445. Mendel first delivered his lecture on pea plants in the year of	1865
4446. Mendel published hi paper "Experiments on plants hybridization" in	1866

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4447. **Later on in 1900, Mendel work was recognized by three investigators:**
4448. A Dutch botanist Hugo de Vries
4449. De Correns of Germany
4450. Tschmarck of Austria

4451. The Darwin's theory of evolution was appeared in the year of	1859
4452. Mendel observed that the recessive character appeared in the F_2 offspring in an average ratio of	3 : 1

4453. **Mendel crossed RrYy x RrYy and the result was**

Round yellow	Round green	Wrinkled yellow	Wrinkled green
9	3	3	1

4454.

4455. Independent assortment of gene was studied by Mendel in	1865

4456. If male plant is Pp and female plant is Pp, the probability of heterozygous plant are
4457. product rule → ¼
4458. Sum rule → ½

4459. **When Corren crossed two pink flowers the result was:**

Red flower	Pink flower	White flower
1	2	1

4460. Blood group system was discovered at the university of the Karl Landsteiner in	1901
4461. ABO blood group system is encoded by the single polymorphic gene "I" on	Chromosomes 9

4462.

ABO blood type	Genotype
A	$I^A I^A$, $I^A i$
B	$I^B I^B$, $I^B i$
AB	$I^A I^B$
A	ii

4463. The major types of blood group systems are	30
4464. The minor blood group systems(rare blood types) are	More than 200

4465.

Rh blood type	Rh factor or integen	Anti Rh antibodis	Donors	Genotypes
Rh^+	Present	Absent	Rh^+ / Rh^-	DD / Dd
Rh^-	Absent	Present	Only Rh^-	dd

4466. The antigen of Rh was discovered in the Rhesus monkey by	Landsteiner in 1930s
4467. The Rh blood group system currently consist of	50 defined blood groups
4468. The more common of Rhesus blood groups are	D, C, c, E & e
4469. The commonly-used terms Rh factor, Rh positive and Rh negative refer to the	D antigen only
4470. ABO blood group system are controlled by a dominant secretor gene	"Se" on chromosomes 19
4471. Rh blood group system is encode by three genes C, D & E	2 tightly linked loci

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which occupy

4472. When individual are phenotypically O but genotypically they may be like A, B or AB, this is	Bombay Phenotype
4473. The Bombay phenotype was first discovered in in 1952 by	Dr. Y.M Bhende
4474. Bombay phenotype is present about	**0.0004%** (4 per million)
4475. The maximum possibility of Bombay phenotype is	**0.01%** (1 in 10,000)

4476. **Qualitative traits:**

S.No	Organism/Part	No of phenotypes	Phenotypes
1	Pea seed shape	2	Round & wrinkled
2	4' O clock flower	3	Red, Pink & Water
3	ABO blood group system	4	A, B, AB & O

4477. **Quantitative traits (polygenic traits/multiple gene):**
4478. Height
4479. Weight
4480. Intelligence
4481. Skin colour
4482. Wheat grain colour

4483. Number of population of all phenotypes of wheat population are	7

4484.

Colour	F_2 generation		No of red pigment
Dark red	1	**AABBCC**	6
Moderately dark red	6	**AaBBCC, AABbCC, AABBCc**	5
Red	15	**AABBcc, AAbbCC, AAbbCC**	4
Light red	20	**AaBbCc, AABbcc,aaBbCC**	3
Pink	15	**AaBbcc, AabbCc, aaBbCc**	2
Light pink	6	**Aabbcc, aaBbcc, aabbCc**	1
White	1	aabbcc	0

4485. Alleles A,B and c codes for an equal amount (dose) of	Red pigment

4486. **Different shades of skin colour:**

Alleles colour shades	Pigment	Ratio
Dark brown	6	1
Moderate dark brown	5	6
Brown	4	15
Light brown	3	20
Pinkish brown	2	15
White brown	1	6
Pure white	0	1

4487. *Total combinations: 64

4488. The number of gene is greater than number of	Chromosomes
4489. In humans, the sickle cell anemia, leukemia and albinism	Chromosomes 11

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are found on

4490. **Detection of gene linkage:**
4491. Heterozygous individual(F_1) is crossed with recessive parent(P_1), then if
4492. If all phenotype are produced in equal (1:1:1:1) then there is no linkage between genes.
4493. If more parental and less recombinant are produced then it is incomplete or partial linkage.
4494. If only parental types are produced then tight or complete linkage is believed.

4495. **T.H Morgan experiment:**
4496. → Normal is dominant over vestigial and gray is dominant over black.

Body	Wings	Type	Numbers
Gray	Normal	Parental	65
Black	Vestigial	Parental	944
Gray	Vestigial	Recombinant	216
Black	Normal	Recombinant	185

4497. So it is incomplete or partial linkage.

4498. **Recombinant frequency % = sum of recombinants / sum of combination(parental + Maternal) x 100**

4499.

b--------cn----------vg

4500. Distance between:
4501. b and vg → 17%
4502. b and cn → 9%
4503. cn and vg → 9.5%

4504. One map unit is supposed to equal to | 1% recombination frequence

4505. **There are wide variety of sex determining mechanisms but three patterns are more common which are:**

Type	Found in	
XO-XX	Grasshopper and pr tenor bug	ETEA-2017
XY-XX	Drosophila and humans	ETEA-2012
XX-XY / WZ-ZZ	Birds, butterflies and moths	

4506. A chance that a man will inherit the colour blind trait from a carrier mother is | 50%

Chapter No.21 DEVELOPMENT AND AGING

4507. The first two identical cells are produced called blastomeres after	First cleavage division
4508. The first cleavage takes place after	36 hours of fertilization
4509. The no of cells which are berry-shaped in morula are	16 or more cells
4510. After 3-4 days The embryo consist of	100 or more cells
4511. When embryo become of 100 cells there is a process of compaction in neighboring calls are called	Compaction
4512. The inner cell mass in trophoblast consist of	20-30 rounded cells
4513. The two layer embryonic disk transforms into a three layer embryo	During week 3
4514. The first axial support of the embryo is	Notochord
4515. When notochord is formed the length of the embryo is	2 mm long

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4516. The first major event in organogenesis is	Neutralization
4517. The superior margins of the neural folds fuse forming a neural tube	At day 22
4518. The three primary brain vesicles (fore-mid-hind) are formed at the	End of first month
4519. All brain flexures are evident; the cerebral hemisphere cover the top of the brain at the	End of the 2nd month
4520. *Acetabularia* are found in European seawater and its length is	2 – 3 inches
4521. The German zoologists Hans Spemann and Halide Mangold discovered in an early gastrula an extremely important morphogenetic field with amazing properties in	1920s
4522. Through technically difficult because the gastrulas were only about	2 nm

Each three month period of pregnancy is called Trimester.

4. Fetal development: The first trimester: weak 1 – 12.
5. Foetal development: The second trimester: weak 13 – 24
6. Foetal development: The third trimester: weak 24-36

4523. During each trimesters the fetus	Grows and develop
4524. In pregnancy the implantation takes place at	Fourth weak
4525. The baby's brain, spinal cord, heart and other organs begin to form	At 5th week of pregnancy
4526. The beginning of embryonic period is marked by	5th week of pregnancy
4527. In second trimester the foetal ear begins to stand out at the side of head and allow the foetus	To hear the sound
4528. The head is about half of the overall size of foetus in	Second trimester
4529. The foetus grown rapidly at fifth month and internal organs continue	To mature
4530. In second trimester, hairs starts to appear and	Finger prints developed
4531. In third trimester the weight gain is	28 g per day
4532. The foetus begins to move rapidly and woman can felt it, this is	Third trimester
4533. The fetal head descend into pelvic cavity by.	Third trimester
4534. 38 or 40 weeks into pregnancy, baby weight might by **18-20 inches**	And weight is **6-9 pound**
4535. Usually, the baby is fed on the maternal milk for upto	Two years
4536. In first trimester the miscarriages are due to a chromosome abnormality in the foetus and this is about	50 %
4537. The adult height accumulated by the leg length is	Half

Chapter No.22 INHERITANCE

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4602. A chance that a man will inherit the colour blind trait from a carrier mother is	50%

Chapter No.23 CHROMOSOMES AND DNA

4603. Questions	Answers
4604. Gregor Mendel's "heredity factors", were purely an abstract concept when he proposed their existence in	1865

4605.

Species	Pairs of chromosomes

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Penicillium	1	
Ferns	500	

4606. **A haploid cell may be:**
4607. Monoploid → one set
4608. Diploid → two sets
4609. Triploid → three sets
4610.

Species	Somatic number	Haploid	Monoploid (n)
Human	46 (2n)	23 (n)	23
wheat	42 (6n)	23 (n)	7

4611. **Generally chromosomes are made of:**
4612. DNA (40%)
4613. Proteins (60%)

4614. Each chromatid has	One DNA molecule
4615. An average size of human chromosomes are	5 cm long
4616. The number of nucleotides in DNA are about	140 million
4617. During S phase of cell cycle DNA and histone are completely	Disorganized

4618. The organization of chromosomes occur in four levels;

S.No	Level	Thickness and diameter
1	DNA	2 nm thick
2	Nucleosome string	10 nm thick
3	Chromatin fiber/ solenoid	30 nm thick
4	Super coil	200 nm diameter
5	Chromatid	700 nm diameter

4619. 200 nucleotides wrap twice around the core of histone proteins forming	Nucleosome

4620. **Historical background of genes:**
4621. Charles Darwin first conceived idea of heredity units when he published his theory of pengenesis in 1868. In this model the circulating unit was **Gemmules.**
4622. In the 1890s Hugo De Vries took the term "pangenesis" and transmitted it to "**pangene**" for the units of inheritance.
4623. Wilhelm Johansson introduced the term "**gene**" to replace several contending and misleading terms for the basis unit of heredity in 1909.
4624. The term :"**genetics**" came earlier, when William Betson coined the word in 1906 to represent the new field that studied heredity, variation and evolution.

4625. **Regions of genes:**
4626. Regulatory region
4627. Promoter → 5' ends
4628. Terminator → 3' ends
4629. Structural region
4630. Introns → non-functional
4631. Exons → functional

4632. The chromosomes theory of inheritance was confirmed	1910

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in

4633. **Griffith's Experiment (1928) :**

4634. The agent responsible for transforming R-type to S-type went undiscovered until — 1944

4635.

Experiment	Year
Gr ffith's	1928
Avery's	1944
Hershey and Chase	1952

4636. It was not known that either DNA or protein possesses heredity information for bacteriophage till — 1952

4637. Overall three models to explain the replication process in DNA:

S.No	Model	Parental DNA is
1	Semi conservative model	Partially conserved into daughter DNA
2	Conservative model	Fully conserved into daughter DNA
3	Dispersive model	Dispersed into fragments

4638. → The three models of DNA replication were evaluated by Mathew Meselson and Franklin Stahl of the California Institute of technology on 1958.

4639. The direction of replication of DNA is from — 5' to 3'

4640. The second unit of DNA polymerase-III are allowed to polymerize daughter strand up to a specific length such as

4641. 100 – 200 nucleotides in prokaryotes

4642. 1000 – 2000 nucleotide in eukaryotes

4643. **Binding sites in prokaryotes:**

4644. TATAAT → -10 sequence

4645. TTGACA → -35 sequence

4646. **Binding sites in eukaryotes:**

4647. TATA (TATA box) → -25sequence

4648. CAAT (CAAT box) → -70 sequence

4649. Subunits of RNA polymerase are — Four

4650. In eukaryotes, the number type of RNA polymerase is only — One type

4651. In elongation phase, towards the terminal region the RNA polymerase keep on moving towards the — 5' to 3' direction

4652. A cap(attached to 5' end) is in the form of — 7-methyl GTP

4653. A tail or poly-A tail(attached to 3' end) is small chain of — 30-500 adenine nucleotides

4654. The total number of codes of codons are — 64

4655. Amino acids leucine and serine are encoded by — Six codons

4656. The study of genetic codon of mitochondrial DNA however, showed that genetic code is not that universal. e.g:

Codon	Nuclear DNA	Mitochondrial DNA
UGA	Stop codon	Tryptophan
AUA	Iso leucine	Methionine
AGA & AGG	Arginine	Stop codon

4657. Various forms of euploidy are:

4658. Triploidy → three sets

4659. Tertaploidy → four sets

4660. Pentaploidy → five sets

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4661. Hexaoploidy →six sets and so on.

4662. **Down syndrome:**

Age	Birth
Before 30	1 per 800
35	1 per 350
40	1 per 100

4663. **Klinefelter's syndrome:**

4664. 1 in 5000 to 1000

4665. 1 in 50,000

4666. **Turner's syndrome:**

4667. 1 in 2500

Chapter No.24 EVOLUTION

4668	Fossils records indicate that eukaryote evolved from prokaryote somewhere between	1.5 to 2 billion years age
4669	**Hardy-Winberg equilibrium equation** → $p^2 + 2pq + q^2 = 1$ p is frequency of dominant allele q is frequency of recessive allele Here p^2 is frequency of dominant allele(AA), 2pq is the frequency of the heterozygous(Aa) q^2 is the frequency of homozygous (aa) ones.	
4670	Evolution in its modern form was first explored by Charles Darwin in	1859
4671	The time from which life is originated is some	3.5 billion years ago

Chapter No.25 MAN AND HIS ENVIRONMENT

4672. The salt water present on earth is	97%
4673. The percentage of fresh water is	3%
4674. The fresh water present in the form of ice is	66% of total
4675. The water present in solid form is	2%
4676. All the world water which is useful for humans and land animals are	1%
4677. The earth atmosphere almost	80% nitrogen gas
4678. **Nitrogen fixation**: Nitrogen gas can be fixed by three ways: Atmospheric fixation → 5-8% Industrial fixation →32-35% Biological fixation → 60%	
4679. The process which is used for making nitrogen containing fertilizers	Haber process
4680. The reduction of nitrogen gas to ammonia requires ($N_2 + 3H_2 \rightarrow 2NH_3$)	16 molecules of ATP
4681. The net energy production at one trophic level is passed on to next level is	10%

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4682. Productivity in land ecosystems generally rises with temperature up to about	30^0 C

4683. **There are three types of pyramids:**
4684. Pyramid of energy → g/m^2 or C/m^2
4685. Pyramid of biomass
4686. Pyramid of numbers

Levels of organisms	Pyramid of energy	Pyramid of biomass	Pyramid of numbers
Third level consumers	0.1%	1.5	
Secondary consumers	1%	11	90,000
Primary consumers	10%	37	200,000
Primary producers	100%	309	1,500,000

4687.

4688. The malnourished in all over the world are about	1 to 2 billion
4689. The people that are now hungry and malnourished in china are	80 million
4690. Most of the 99% food supply of the world comes from the	Land
4691. The 1% food supply to world comes from	Ocean and aquatic habits
4692. To form 25 mm of soil under agricultural conditions need	500 years
4693. During one growing season, a hectare of corn will transpire	5 million liters water
4694. The amount of water needed to reach to 1 hectare is	8 million liters
4695. The fresh water which is used by agricultural is	87 %
4696. The disease occur due to lack of clean water in developing countries are about	90 %
4697. The cases of diseases that are contracted from water are	4 billion
4698. The death occurs due to water-borne disease are about	6 million per year
4699. The number of people living in urban areas is doubling every	10 to 20 years
4700. The nuclear accident at Chernobyl was the worst nuclear accident to date, spewing about	100 million curies radioactive materials

4701. **Sources of carbon dioxide:**
4702. Electricity generation (41 %)
4703. Transportation (2nd largest source)

4704. Permanent removal of standing forest is called	Deforestation
4705. The rise in average global temperature at the end of next century is	1.5^o C to 4.5^0 C
4706. Acid rain have PH	Less than 5.6
4707. The ozone layer or stratospheric ozone is a high concentration of ozone molecule on the height from	30-50 kilometers the maximum
4708. Ozone molecules are about 12,000 in	1 Arab of total molecules
4709. 3 lac non-melanoma and 4500 melanoma skin cancers worldwide annually caused due to	10 % decrease in ozone

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4710. 16 million people in the world every year suffer from blindness due to	Loss of transparency of lens
4711. 20% of cataracts may be caused by over exposure to the	UV radiation
4712. Approximately tidal cycles in one year are about	705
4713. The average increase in temperature with depth of earth is 1°C for every	30 to 40 meter depth
4714. At depth of 3-4 km in earth	Water boils
4715. At depth of 15kms the temperature is in range of	1000°C to 12000°C

Chapter No.26 BIOTECHNOLOGY

4716.

4717. **Types of cloning vectors are six:**

Types of vector	Insert DNA size in kb
Plasmid cloning vectors	0.5 – 8
Bacteriophage cloning vectors	9 – 2.5
Cosmid-cloning vectors(combination of plasmid and phage DNA)	30 – 45
Yeast artificial chromosomes	250 – 1000
Bacterial artificial chromosomes	50 - 300
Animal and plant vector (shuttle vector)	>1000

4718.

4719. The natural s bacterial plasmid could be modified to produce new plasmid like	pBR322
4720. The first widely used purpose built plasmid vector is	pBR322

4721. **Useful features of pBR322:**

4722. Origin of replication → pMBI fragment which is origin of replication

4723. Size → 4,363bp

4724. Copy number →15 copies per cell

4725. Selectable marker →two antibiotic resistant genes(ampicillin and tetracyline)

4726. Cloning sites

4727. There is room in pBR322 for an insert of at least	6 kbp
4728. On pBR322, sites for Pse I, Pvu I and Sac I are found on	Ampicillin
4729. On pBR322, sites for Bam HI and Bam HIII are found on	tetracyaline
4730. Polymerase chain reaction was invented by Kary Mullis in 1983 and he was awarded by noble prize in	1993

4731. **Mechanism of PCR reaction:**

4732. Denaturation (94°C for 1-5 min)

4733. Primer annealing (54°C for 2 min)

4734. Extension or polymerization (72°C for 1 min)

4735. *54-72-94 → 1-5→2→1

4736. In 1975-1977, Allan Maxam and Walter Gilbert developed a DNA sequencing method which is also called as	Chemical cleavage method
4737. The DNA to be sequenced is end labeled by kinase treatment with	32P ATP
4738. Dimethylsulphoxide (DMSO) is then added and the labeled DNA samples are heated with	90°C
4739. In nucleotide sequences of genome, entire human have	99% similarity
4740. 1% difference in genome sequences that establishes the individuality	Of every person

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4741. **Major goals of Human Genome Project(HGP) was:**
4742. To identify 20,00 to 25000 genes of humans
4743. To identify 3 billion chemical bases pairs of human DNA .

4744. The first transgenic organism is	Bacteria (1973)
4745. Herbert Boyer(1978) inserted human insulin gene to *E.coli* to produce	Synthetic human insulin
4746. The first field trials of genetically engineered plants occurred in	France and USA in 1986
4747. The Dolly sheep was produced in	July 2002
4748. Never to produce microbial or other biological agents or toxins, whatever may be their method of production, for use in wars	Biological weapon conventions of 1972

Chapter No.27 BIOLOGY AND HUMAN WELFARE

4749. The people living on the planet earth are	7 billion

4750. **Schedule of vaccines against common disease:**

	Disease	Vaccine	Type	Age group
4751.	Polio	OPV (Oral Polio Vaccine)	Live	Birth- % years
4752.	Tuberculosis	BCG (Bacillus Calmette Guerin)	Live	At birth
4753.	Typhoid	Typhoid vaccine TAB vaccine (Typhoid Paratypoid A and Partyphoid B)	Kill	2 years of age
4754.	Hepatitis	Hepatitis B vaccine	Subunit	Any age
4755.	Diphtheria & tetanus	Diphtheria toxoid vaccine Tetanus toxoid vaccine	Toxoid	childhood

4757. The people of Pakistan who are engaged in livestock are	30-35 million

On the basis of fat contents the various milk products are as follow:
4758. Cream → 10-70% fat content
4759. Khoya → by water evaporation and by reducing bulk to 70-75%

Advantages of artificial insemination are:
4760. 3000 females can be fertilized from semen of one bull
4761. Semen can be stored
4762. High success rate of fertilization

THE END

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